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THE BUILDER

INCORPORATING

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THIS WEEK'S NEWS

PAGE

THAT MORE IS TO BE LEARNED, from a long-term point of view, from the general spirit and outlook of the American industry than from details of organisation and technique, is one of the principal conclusions of the British Building Productivity Team. 621

THE ASSESSORS for the Coventry Cathedral Competition have been announced as follows :—Sir Percy Thomas, O.B.E., Mr. Edward Maufe, R.A., and Mr. Howard Robertson, A.R.A. 624

THE MINISTER OF HEALTH has restored to housing authorities discretion to issue licences for houses for owner-occupiers up to a maximum of one-fifth of their allocation or, exceptionally, beyond. He has also agreed to licences being "mobile." 625

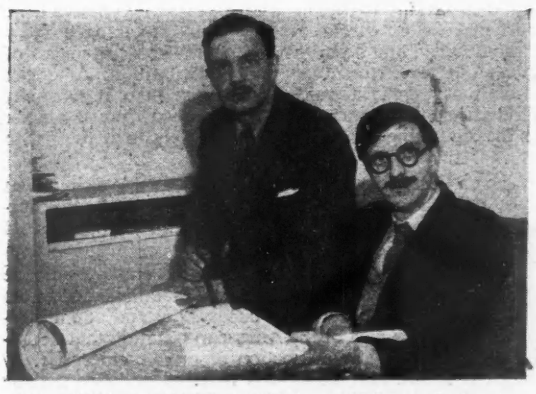
BUILDING PROGRESS IN CANADA and the opportunities available in that country for British manufacturers and producers are matters dealt with in an article on page 626

THE PROBLEM OF HIGH COSTS is one of the major issues confronting the building industry in South Africa. 628

A COMMERCIAL GLASSHOUSE, incorporating glued laminated arches, is illustrated on page 636, *and details and illustrations are also given of a prestressed concrete bridge over the river Tame.* 640

A REVIEW is given, with illustrations, of exhibits—chiefly those of interest to builders—at the British Industries Fair. 648

A REVIEW of the "Slum Rehabilitation" campaign now being carried on in America gives details of some of the more important regulations governing the hygiene of housing contained in the Baltimore Housing Code. 658



MR. RICHARD TURLEY, A.R.I.B.A., A.M.T.P.I. (with glasses), and MR. W. H. WILLIAMSON, A.R.I.B.A., whose design, placed first in the competition for a hall of residence at Nottingham University, was illustrated in our last issue.

OVERSEAS MARKETS FOR BUILDING

THE building plant and materials industries must clearly take their place among those better recognised export trades which are seeking to swell the sum total of U.K. exports and so enable this country to maintain its standard of living. The end of Marshall Aid, due next year, only intensifies the need to widen markets and increase the volume of goods leaving these shores. This is an economic matter into which politics do not enter.

The value of exports of building materials is not negligible. 1947, 1948 and 1949 figures of £16.9, £28.4 and £28.9 millions, respectively, show an upwards tendency which is good. To some extent, further expansion is governed by our own needs and resources, but much is being developed and made in the United Kingdom which could be exported, provided that the essentials of price, quality and style and delivery are maintained. Advice and much information on these matters are available from the export departments of the Board of Trade and the Ministry of Works.

Probably no country offers greater opportunities to the exporter of building plant and materials than Canada, which is engaged in a tremendous constructional drive. Construction and repair in 1949 reached the unprecedentedly high level of $2,727 millions, the housing programme being 35 per cent. above pre-war peak. The general level is not expected to fall in the near future though there may be further emphasis on housing. While many materials are required, in 1949 U.K. exports to Canada were yet only a little over £2 millions in value. It is in the belief that there is a vastly wider market, a permanent one moreover, that *The Builder* is sending a small, independent mission to Canada which will study at first-hand the constructional programme in the principal cities from Montreal to Vancouver and will endeavour to discover what Canadian constructors need that Britain can supply. The findings will be published in this newspaper.

The magnificent display of British plant and materials now on view at the British Industries Fair in Birmingham and London is an indication of the enterprise and manufacturing skill of the United Kingdom. Extended reference to the building side of the Fair is made elsewhere in this issue, and a distinguishing mark is placed against the names of those manufacturers engaged or interested in the export market. The list could be extended. For export three factors seem important : an assured demand, favourable conditions and a genuine desire by the manufacturer to engage in the market. By and large, the first two factors are established ; we shall hope that the last, the will to export, may greatly increase, to the benefit of the manufacturers themselves as well as the country.

BUILDING INDUSTRY PRODUCTIVITY TEAM

COMPARED with the Report of the Working Party, which we reviewed last week, that of the Building Industry Productivity Team which visited America last year under the auspices of the Anglo-American Council of Productivity* is likely to prove more valuable to the extent that it is more critical of all sections of the industry in this country. True, the team made no major discovery which could conceivably revolutionise British building practice, but it did observe many points in American constructional

*Published by the Anglo-American Council on Productivity, 21, Tothill-street, London, S.W.1. Price 2s. 6d.

methods which are collectively of great importance and which, if adopted here, will certainly raise the efficiency of the British industry.

Every member of the team was greatly impressed by the spirit of initiative and co-operation which appears to characterise each section of the American industry and which is shown in the attitude of all towards the work in hand. There are, in this report, lessons for all sections of the industry in this country. For instance, the architect can learn something of the artistry of a flexible architecture of interchangeable units, and the economies to be derived from this conception of planning. American practice can teach the architect who has yet to learn the lesson the advantages to the client, to himself, and also to the contractor of having all drawings and specifications complete in every respect at the tendering stage, and the benefit of avoiding unnecessary alterations or changes of mind either by himself or the client during the progress of the work.

Contractors can derive considerable benefit from studying American methods of organisation, including the intelligent and mutually helpful co-operation which exists between the general contractor and sub-contractor and between one sub-contractor and another, and the efficient dovetailing of trades which results.

The American operative works hard in return for a high wage rate, which provides him with a high standard of living, knowing that his personal advancement depends upon his own efforts. Average unemployment benefit varies, according to State legislation, from 13 to 25 dollars a week. This compares with 100 dollars or more of earnings when employed; the incentive to keep a job is therefore considerable. The output per man-hour on similar site operations is approximately 50 per cent. higher in America than it is in Britain. In the districts visited by the team the craftsmen's rate varied from 11s. 10½d. to 16s. and the general labourers' from 6s. 9d. to 9s. an hour. No bonus or other incentive payments were made. The average rate of wages was more than four times the standard rate in Britain and, in spite of the higher cost of living, this wage purchased considerably more. The report contains a table showing the number of hours which an American workman has to work to buy a number of articles, including foodstuffs, clothing, furniture and amusements. Comparable figures for British workmen are given. The London cost *in hours* varies from 1½ to 12½ times that in New York.

There are more opportunities for administrative and supervisory staff on the site in America than in Britain. This follows from a greater measure of devolution of responsibility from head office and a more insistent demand for efficiency of job organisation and speed of construction. There is usually a sufficient supply of experienced supervisors, and competition for the major positions on important contracts is keen. There are greater facilities for the technical education of supervisory staff who, on the whole, possess better educational qualifications than men employed in corresponding positions in this country. The majority of the agents and almost all the junior engineers would have had a full-time high school education up to the age of 17 or 18, followed usually by a technical or college course lasting a further four or five years. The efficiency of American building is greatly assisted by the existence of this large group of college-trained technicians.

Finally, no one questions that the profit motive is an essential feature of industrial life, or that all sections of the industry must be given the necessary incentives, both psychological and material, to develop a pride both in the work they do and in the social status which they gain from their employment.

The high cost of labour in America and the relatively low cost of plant in relation to labour costs make it natural that the building industry there should be mechanised to a greater extent than in Britain, and that machinery should be employed on various operations which would be more cheaply done here by manual labour. The fact remains, however, that, although many of the machines and tools seen in use during the tour are available in Britain, mechanisation is employed much more effectively and more continuously in America. To achieve maximum production, it is vital that British contractors should be persuaded of the advantages of more intensive mechanisation and that British operatives should be trained to take care of plant and to use it effectively. Contractors would be persuaded the more easily if the regular supply of materials to the job could be guaranteed. Expensive plant must be continuously in use if it is to be an economic proposition.

ALISON M. SMITHSON, A.R.I.B.A., Dip. Arch. (Dist.) and PETER D. SMITHSON, A.R.I.B.A., Dip. Arch. (Dist.), who submitted the winning design in the Hunstanton Secondary School Competition. (See pages 642-4.)

The use of heavy plant is facilitated in America by the prevalence of long dry spells and often by the nature of the soil. There are few restrictions either on its use or on its movement from site to site, and electricity for its operation is almost universally available.

Ready-mixed concrete was made and sold in every city visited by the team except Chicago; it is understood that in other parts of the United States practice varies considerably. The advantage of ready-mixed concrete to the architect and building owner lies in the assurance of a uniformly high standard of mix, with clean weight-controlled aggregates and with no risk of water-damaged cement being incorporated. Most ready-mixed-concrete contractors guarantee their mix to be up to the strength specified. From the contractor's point of view, less capital is required for plant and little or no waste of materials occurs on the site. He also saves the labour cost of taking delivery and storage of aggregates and cement, which is particularly important when working on congested sites. Site gangs can be kept to the minimum and in frosty weather the materials and water can be heated. On the other hand, as the contractor is dealing with an expensive product, he must make more careful arrangements for taking delivery without delay, and he may have to provide extra means of access if the concrete is to be poured into position. American regulations permit a much wetter mix than is normally allowed in this country, and a gravity feed from the mixer to the shuttering can be more extensively used than with us.

The absence of scaffolding of the type used in Britain was most noticeable. Most of the work is carried out overhand, enabling trestle and other simplified forms of scaffold to be used.

The team was greatly impressed by the energy, initiative and general efficiency of American building contractors and sub-contractors and their supervisory and administrative staffs. It is part of the American tradition that housebuilding is essentially a function of private enterprise, by which is meant housing that is initiated and financed by private resources either for direct sale or, as an investment, for letting. The total number of housing units begun from the end of the war to the end of 1949 approached 3½ million

(compared with approximately 800,000 in Britain). The rate of production is now over one million a year, which is nearly equal, in relation to population, to the rate of house-building in Britain in the years before the war. Over 80 per cent. of the houses are built by relatively small firms.

This is merely a brief review; we have by no means covered the whole report, which we recommend to the notice of everyone who earns his living in the building industry. Although chock-full of facts and reasoned argument, they will find it a most interesting and easily readable report. We should like to congratulate the authors upon its presentation.

THE HOUSING RATIO

THE Chancellor of the Exchequer announced in his Budget speech last month that the Government's housing target would be 200,000 per annum for three years. The previous Government (which had a majority large enough to justify it in looking ahead) had originally dreamed of the possibility of 400,000 houses a year, had started on a plan for 240,000, and later reduced their optimistic proposals to a programme of 140,000. Later still this reduced plan was discarded and a target of 200,000 set. This was cut by the Chancellor of the Exchequer to 175,000 as part of his proposals for reducing capital expenditure ; it is now again raised to 200,000.

In the first eighteen months after the war private enterprise, being able to get more quickly off the mark, completed 27,444 houses against the local authorities' 18,862. Later restrictions allowed a quota to private enterprise of only 1 in 5, reduced fifteen months ago to 1 in 10. Now the Minister of Health announces, as a *concession* to those who want to own their homes, a return to the 1 in 5 ratio.

Naturally, everyone associated with house-building, the local authorities, the producers, the builders and the operatives have suffered from these changing targets. Private enterprise has probably suffered more than the others because 10 per cent. or even 20 per cent. of the small parts of the total programme for which each individual local authority is responsible represent as a rule a potential private programme too small to be organised for efficient and economic production. The Minister has now somewhat tardily agreed to allow local authorities not only to issue licences up to a maximum of one-fifth of their allocation where they are satisfied that this is justified by the needs of the applicants but also " to consider, exceptionally, applications from local authorities for permission to exceed the figure of one-fifth." The Government have at last discovered that there are districts where the most urgent need of homes may include a proportion of those who wish to build houses for their own occupation.

This decision is a belated concession to common sense rather than a recognition of the rights of a section of the people who are at least as worthy as those who look to the Welfare State to provide and pay for houses out of the bottomless purse. So far as the house-building industry is concerned this decision merely brings them back to a lesser restriction ; it does not yet set them free. Even so, it will be welcomed. It is, however, a pity that the Minister did not go further and give the local authorities power to decide for themselves how much housing they could release to private enterprise instead of merely submitting proposals for the fiat of the housing commissar at Whitehall.

NOTES AND NEWS

An Addition to the "Critics"

MR. HOWARD ROBERTSON'S debut on "The Critics" programme on Sunday morning lent additional interest to this usually stimulating broadcast programme. Mr. Robertson, who with Mr. C. H. James has been responsible for the hanging of the Architectural Room at the R.A., is obviously the right person to talk about it, and his lucid and attractive contribution must have done much to rescue from critical obscurity what has long been the Cinderella's Kitchen of Burlington House.

It is regrettable that the general quality of the designs shown this year did not permit an enthusiastic review. "The architecture," said this Critic, "may be described as a slightly exhausted traditionalism hobbling out of one door while eclectic modernism enters, not too surely, at another." Architectural design, he had earlier remarked, " is moving forward slowly but not in a straight line." The work of the perspectivists came in for praise, however, and many of the drawings enabled the visitor " to take a sort of Cook's architectural tour of frolic and fancy before returning to reality."

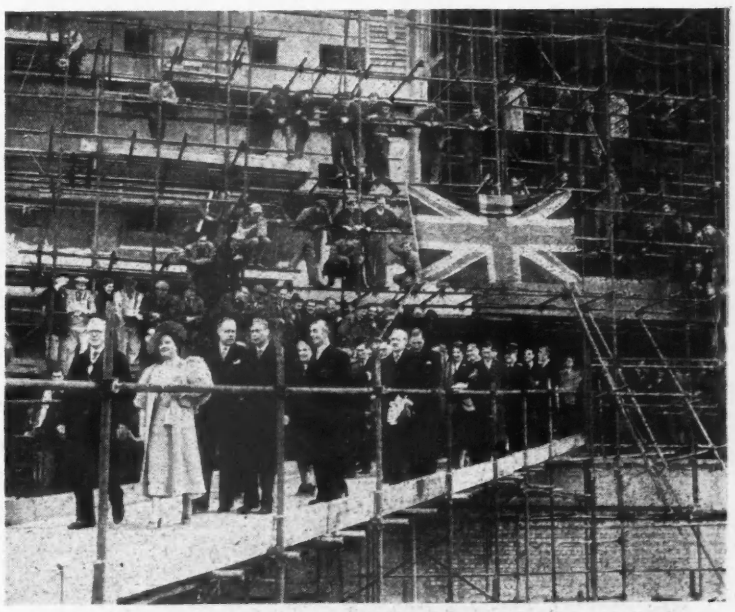
Mr. Robertson brought his gift of the apt phrase to illuminate his text; a particularly happy effort was his description of a perspective of three houses on Campden Hill as "Regency and so in character that you can almost smell the dry-rot." Subsequent discussion was a little aimless and gave the impression that the Critics had skipped too lightly over this part of their homework. An exception was Miss Dilys Powell who praised the high quality of the drawing and deplored the absence of ornament on the buildings. We hope that as a result many more visitors will take the plunge and look intelligently at the Architectural Room at the Academy.

Mecklenburgh-square: An Inquiry.

A PUBLIC INQUIRY, conducted by Mr. H. G. Warren, of the Ministry of Town and Country Planning, is to be held at St. Pancras Town Hall on May 22, to investigate objections to a scheme for developing parts of Mecklenburgh-square, St. Pancras, to provide halls of residence for Commonwealth students in London.

Scholarships in Architecture.

THE COUNCIL of the Architectural Association announce the award of the following scholarships in architecture at the Architectural Association School of Architecture: The "Leverhulme" scholarship (value £1,000), Mr. J. P. Drinkwater, of Cheltenham (North Gloucester Technical College); The "Minter" open entrance scholarship (value £100), Mr. J. Y. Bell, of Carlisle (Carlisle Grammar School, and School of Art); The "Sir Walter Lawrence" open entrance scholarship (value £100), Mr. D. J. Bottoms, of Northampton (Northampton Grammar School); The Metal



ROYAL VISIT TO SOUTH BANK. THEIR MAJESTIES THE KING AND QUEEN VISITED THE FESTIVAL OF BRITAIN EXHIBITION SITE ON THE SOUTH BANK ON MAY 2 AND EVINCED GREAT INTEREST IN THE PROGRESS BEING MADE WITH THE EXHIBITION BUILDINGS AND THE ROYAL FESTIVAL HALL.

THE R.I.B.A. RECEPTION. Councillor A. W. Scott, Deputy Chairman of the L.C.C., being received by the President and Mrs. Waterhouse at the Reception held on April 28.

Window scholarship (value £75) presented by The British Metal Window Manufacturers Association, Ltd., Mr. M. Denn, of London, N.W.10 (Willesden County Grammar School); The Natural Asphalte Council scholarship (value £50) presented by the Natural Asphalte Mine-Owners and Manufacturers' Council, Mr. K. B. Frampton, of Woking (Woking County Grammar School); and The Metal Window senior scholarship (value £50) presented by the British Metal Window Manufacturers' Association, Ltd., Mr. A. J. Short, of Southsea (Southern College of Art, Portsmouth).

A Mud House, Stourbridge.

MR. A. P. DRURY, M.A., town clerk of Stourbridge, informs us that a mud house, No. 33, Cross Walks-road, Lye, Stourbridge, is now vacant and will be demolished in the near future. The Borough Council, it is learned, are anxious that persons interested in the building from an architectural or historic point of view shall have every opportunity of inspecting and photographing the building either prior to or during demolition, and persons interested should get into touch with Mr. Drury.

Professional Announcements.

MR. MARK JENNINGS announces that he has recently formed a partnership under the style of Mark Jennings, Son and Partners, chartered architects, civil, electrical and mechanical engineers. The partners are: Messrs. Mark Jennings, M.I.Mech.E. (senior partner), C. D. Brown, A.M.I.E.E., S. Goudge, A.M.I.Mech.E., A.M.Inst.F., O. C. M. Jennings, M.B.E., B.Sc.(Eng.), and J. M. Slater, A.R.I.B.A. Mr. Leslie Turner, B.Sc., M.I.C.E., M.I.Struct.E., is an associate adviser. The practice continues at 116, Victoria-street, Westminster, S.W.1, and 41, Northgate-street, Bury St. Edmunds.

MR. FRANCIS H. WHITTALL, A.R.I.C.S., chartered quantity surveyor, of 25, Chester-street, S.W.1, has opened additional office accommodation at 24, Buckingham-street, Adelphi, W.C.2. Tel.: Trafalgar 3381.

MESSRS. MARTIN AND MARTIN, quantity surveyors, of Eastbourne, Sussex, announce their change of address on May 1 from 10, Gildredge-road to new and larger premises at 5, Hyde-gardens, to which all communications should now please be sent. Tel.: Eastbourne 6225 (2 lines). Latest trade catalogues are always welcomed.

COMING EVENTS

Friday, May 12.

INSTITUTE OF ECONOMIC ENGINEERING (SOUTH LONDON REGION).—"The Will to Work"—a discussion on industrial incentives, opened by Mr. J. A. Bullock. "Elephant and Castle," S.E.1. 7 p.m.

INSTITUTE OF ECONOMIC ENGINEERING (NORTH-WEST LONDON REGION).—Mr. A. P. Young, O.B.E., on "Management and its Human and Social Implications." Cowdray Hall, Cavendish-square, W.1. 7 p.m.

Monday, May 15.

INCORPORATED INSTITUTE OF BRITISH DECORATORS.—"Decoration Work in the Industrial Field," by Mr. H. Hudson. R.S.A., 6, John Adam-street, Adelphi, W.C.2. 6.30 p.m.

Tuesday, May 16.

HAMMERSMITH SCHOOL OF BUILDING.—Mr. D. E. Woodbine Parish, F.I.O.B., on organisation in the building industry. School of Building, Lime-grove, Shepherd's Bush, W.12. 3.15 p.m.

ILLUMINATING ENGINEERING SOCIETY.—Summer meeting. Buxton.

Wednesday, May 17.

ROYAL SOCIETY OF ARTS.—"Rural Water Supplies," by Mr. Peter Lamount, M.A. R.S.A., John Adam-street, W.C.2. 2.30 p.m.

BUILDING SOCIETIES' ASSOCIATION.—Opening of annual conference, Harrogate. Continuing until May 19.

WOMEN'S ADVISORY COUNCIL ON SOLID FUEL.—Conference on "New Trends in House Heating." R.I.B.A., 66, Portland-place, W.1. 2 p.m.

Thursday, May 18.

ROYAL SOCIETY OF ARTS.—"The Recent Work of Archæologists in India," by Mr. R. E. Mortimer Wheeler. R.S.A., John Adam-street, W.C.2.

SOCIETY OF CHEMICAL INDUSTRY (ROAD AND BUILDING MATERIALS GROUP).—A.G.M., followed by (a) "The Non-Destructive Testing of Road Materials," by Dr. R. Jones, of the Road Research Laboratory, D.S.I.R., and (b) "Dynamic Testing of Road Constructions," by M. C. Van der Poel, of Koninklijke-Shell Laboratium, Holland. Road Research Laboratory, D.S.I.R., Harmondsworth, West Drayton, Middlesex.

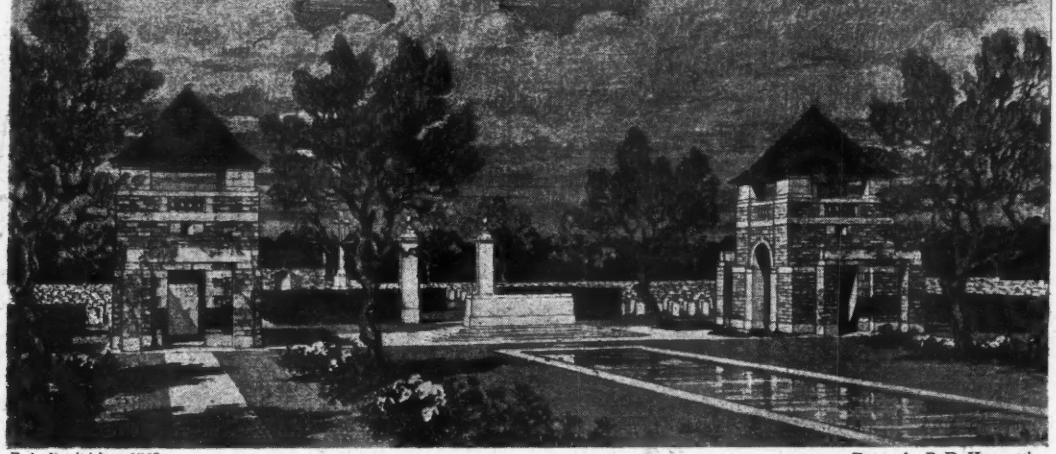
Friday, May 19.

TOWN PLANNING INSTITUTE.—Opening of the 24th annual country meeting. Dublin. Gresham Hotel. Continuing until May 21.

FROM "THE BUILDER" OF 1850

Saturday, May 11, 1850.

DERBY—right pleasant "Darbie," as we recollect it—is greatly changed. But a few years since, there mustered only 10,000 inhabitants. Then the Derwent hurried on its joyous way, sparkling brilliantly; the sun shone on its course, and lambs were seen basking on its green bank; the gardens of the few suburban seats dotting its shores extended to the water's edge, and the wherry—the delight of its healthy freight—was safely moored alongside the apology for a quay. Now all is changed: a cloud has darkened the sky. The magic wand of "business" has transformed the hitherto rural locality into what the stranger may call "a dirty town, begrimed with soot."



R.A. Exhibition, 1950. Drawn by P. D. Hepworth.

CANADIAN CEMETERY AT BENY-SUR-MER, FRANCE. PHILIP D. HEPWORTH, F.R.I.B.A., ARCHITECT

BUILDING PRODUCTIVITY TEAM REPORT

Recommendations following Visit to U.S.A.

THE PRODUCTIVITY TEAM from the British building industry which last year visited the U.S.A. under the auspices of the Anglo-American Council on Productivity has issued a unanimous report, which contains far-reaching proposals and recommendations for increasing productivity in the country. The Report, which is summarised below, is illustrated with numerous photographs and diagrams, and it examines in great detail the organisation, constructional techniques and psychology of the industry in America. Copies of the Report, price 2s. 6d., may be obtained from the R.I.B.A., 66, Portland-place, W.1 ; the N.F.B.T.E., 82, New Cavendish-street, W.1 ; or the Anglo-American Council on Productivity, 21, Tothill-street, S.W.1.

THE TEAM differed from most other productivity teams in that it included representatives not only of management and labour but also of the professions associated with the industry in the persons of leading architects and quantity surveyors. Its six weeks' tour ranged from Boston in the north to Washington in the south and as far west as Chicago—the part of the U.S.A. in which conditions are most nearly comparable with those in Britain.

Throughout the Report emphasis is laid on the duty of each individual in the industry to do all he can to increase output, and, in order to bring home to as many as possible the lessons learned in America, members of the Team now intend to explain them at meetings throughout the country.

Separate chapters of the Report discuss: the structure of the industry in America; the architect's contribution to productivity; American and British tendering procedure; the contractor's organisation; constructional techniques and the use of materials; industrial organisation and labour relations; labour productivity and recruitment; and housing.

The Report points out the difficulty of making a comparison of individual rates of productivity in the building industry, where structures differ and conditions vary widely. The Team found general agreement in America that individual productivity fell during the war and was now noticeably increasing. The drop during the war was, as in Britain, due to shortages and delays in delivery of materials, shortage of labour, and the inferior quality and increased age of the labour available.

From a comparison of work on various site operations, the Team concludes that the output per man-hour on similar site operations is about 50 per cent. higher in America than it is in Britain. This is due primarily to the greater speed at which the operatives work and the ready supply of materials to craftsmen.

It is recognised that the American craftsman has many advantages—in better organisation of the job, the supply of unskilled labour, breaking down of craft operations, easier travel to work (generally in his own car) and better food—but a large part of the difference, it is stated, can be accounted for only by the individual attitude towards work. The American has never acquired the habit of doing less than he is capable of doing, and there is so far little evidence of a worker group-consciousness in U.S. industry. The whole American way of life is a challenge to the individual to give of his best. Having secured employment in a highly competitive industry that offers a high standard of living, the worker is prepared to make a real effort to retain it, and the influence of his wife, and her desire for a well-equipped home (almost every article of household equipment is obtainable by hire-purchase) should not be underestimated.

Reserve of Unemployed

Another fact influencing productivity in America is the existence of a reserve of unemployed workers. As full employment is accepted policy in this country some new incentives will have to be found—for example, a system of payments by results—which, because of other factors in the American economy, do not find favour there.

The British operative must, like the American, realise that his standard of living is linked to the efficiency of the industry and depends on his personal contribution. Present living standards, low as they are compared with those in America, are in danger unless every member of the industry plays his part in eliminating waste of effort, improving organisation and building up a high rate of productivity.

The Report does not confirm the belief that, in spite of higher wages, building costs in U.S.A. are only slightly higher than here. At the old exchange rate of four dollars to the pound, it is calculated that costs vary, according to the type of building, from about 55 to 80 per cent. above those in Britain. From figures obtained it is estimated that unit rates average about 80 per cent. more in the U.S. The cost of materials is slightly higher.

THE TEAM

MANAGEMENT GROUP.

ROBERT O. LLOYD, O.B.E. (*Team Leader*), President (then Senior Vice-President), National Federation of Building Trades Employers. C. DOUGLAS CALVERLEY, Member of Council, N.F.B.T.E., Vice-President, Federation of Registered House-Builders. WALTER R. COWEN, President, Federation of Associations of Specialists and Sub-Contractors. N. STANLEY FARROW, M.B.E., Member of Council, London Master Builders' Association. ROBERT S. GRAY, Senior Vice-President, Scottish National Building Trades Federation (Employers). WILFRED HORSFALL, Vice-President, N.F.B.T.E.

PROFESSIONAL GROUP.

ROBERT H. MATTHEW, A.R.I.B.A., Architect to the London County Council. MICHAEL T. WATERHOUSE, P.R.I.B.A., M.C., President, Royal Institute of British Architects. T. CUTHBERTSON HILL, F.R.I.C.S., Chairman, Quantity Surveyors' Committee, Royal Institution of Chartered Surveyors. MONTAGU H. THACKRAY, F.R.I.C.S., Member of Quantity Surveyors' Committee, R.I.C.S.

OPERATIVES' GROUP.

J. PATRICK BATES, Plumber. FRANCIS W. BEAZLEY, Industrial Administrative Assistant, National Federation of Building Trades Operatives. WILLIAM J. CLARKE, Plasterer, Branch Secretary, National Association of Operative Plasterers. WILLIAM R. JOHNSTONE, Carpenter and Joiner. GLYNN LLOYD, Painter and Decorator. Apprentice-Master Scheme Instructor. JOHN H. MCKECHNIE, Clerk of Works, Bricklayer, Member of Executive Council, A.U.B.T.W.

The Team Secretary was MR. C. GORDON ROWLANDS, M.A., Secretary of the N.F.B.T.E.

MR. ROBERT O. LLOYD, O.B.E., President, N.F.B.T.E., the leader of the Team.

The average hourly rate of wages is put at rather more than four times the standard rate in Britain. The craft rates in the cities visited, excluding painters, range from 2.25 dollars for carpenters in Boston and Buffalo to 3.20 dollars for bricklayers and plasterers in New York, and the labourer's rate from 1.45 to 1.85 dollars, though the averages for the whole country would be lower. The labourer's rate averages 65 per cent. of the craft rate, compared with over 80 per cent. in Britain.

Cost of Living

The argument that the high wage rates in U.S.A. are made necessary by the high cost of living is described as an overstatement. The proportion of wages spent on necessities is lower and the general standard of living considerably higher in America than in Britain. A table compares the length of time which a building trade craftsman in London and in New York has to work, in order to earn the price of certain articles of food, clothing, etc. Taking the New York figure for each article as 1, some of the London figures are: white bread, 1.60; apples, 11.30; tea, 3.60; milk, 4.42; eggs, 4.57; beef sirloin, 2.28; suit, 5.91; shirt, 10.77; rayon dress, 8.60; nylon stockings, 8.56; mattress, 6.57; carpet, 4.92; sheet, 10.96; dining room suite, 5.18; radio set, 9.86; cinema, 3.04; petrol, 8.44; Scotch whiskey, 5.63; and gin, 9.51. But for housing, about the same proportion of the weekly wage packet is required. This superior earning power does not appear to diminish the American's urge to earn more.

The main impression which members of the Team brought back from their tour was that of the spirit of initiative and co-operation which animates all sections of the American industry. There is, they report, a general belief in the need for experiment and progress, and this, with the direct material incentives to self-advancement and the penalties for failure to keep abreast of the times, accounts for the speed and efficiency of construction. Examples of such speed were the fixing of 700 tons of steel work in 3½ days on a State hospital contract and the erection of the framework and floors of two storeys of a skyscraper block in one week.

Co-operation and Organisation

The speed and efficiency are based on co-operation and organisation at all stages. They are based also on a ready availability of every material and fitting and an adequate supply of labour, which are not found in Britain to-day. These conditions allow the complete pre-planning of the whole structure, and the setting of a target which each member of the building team can and must reach.

All this derives from the spirit of competition which makes all concerned strive continuously to reduce costs. "Architects compete in efficiency in their relations with their clients and with contractors; there are more contractors than contracts, and competition for work is evident both in time and in price. There are more workers than jobs, and there is competition to gain and retain the jobs which provide the high standard of living of the American building operative."

The Report points out, in contrast, that the heavy subsidisation of building in Britain, however necessary it may be, diminishes the incentive to secure lower costs.

In the opinion of the Team more is to be learned, taking a long view, from the general spirit and outlook of the American industry than from details of organisation and technique. The team made no major discovery which could conceivably revolutionise British building practice in a short time, though there are many points in American constructional methods which, if adopted, will raise the efficiency of the British industry.

In America no one questions that the profit motive is an essential feature of industrial life, and that all sections of the industry must be given the necessary incentives, both psychological and material, to feel pride both in the work they do and in the social status which they gain from their employment; but the Report observes that it does not appear "that the Americans themselves have discovered, any more than we have, the solution of the problem of securing high productivity in times of full employment."

Factors for High Productivity

These points are emphasised in the Team's conclusions and recommendations. The most important, but not the only, factors which make for high productivity in the U.S.A. are stated to be:—

(1) The complete pre-planning of the job by building owner, architect and contractor;

(2) The proper co-ordination of sub-contractors' work and the effective collaboration between them and the general contractor;

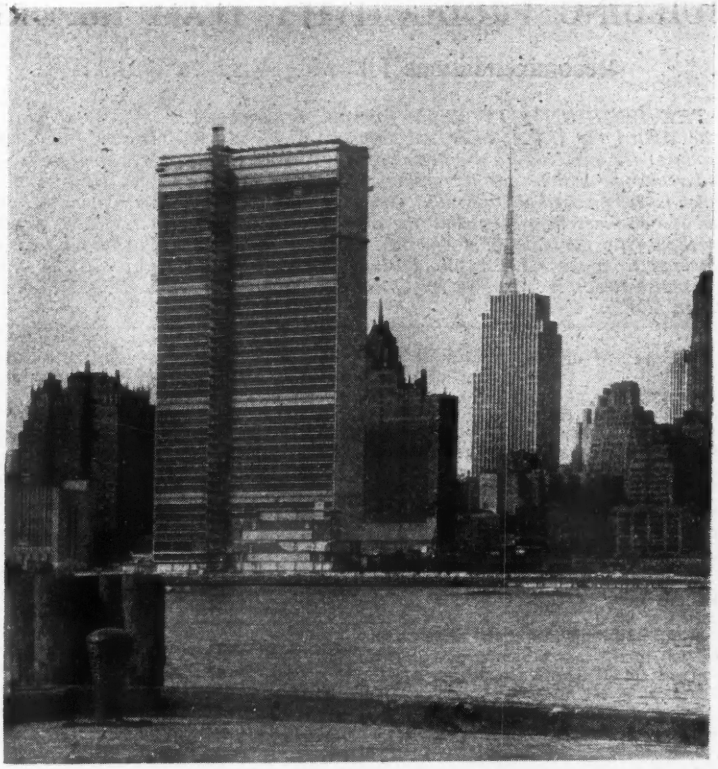
(3) The adequacy of the supplies of labour and materials and the absence of restrictive controls;

(4) The general availability and use of mechanical aids;

(5) The recognition of the importance of continuous research into the production of materials and into building techniques;

(6) The nation-wide stimulus of the American industrial climate, which has a great effect on the output of every individual and which is shared by all members of the building industry. This last reason, it is added, is perhaps the most important of all.

Apart from the adequacy of supplies of materials, all these influences towards higher productivity can be developed in the British industry by its own efforts.



THE UNITED NATIONS SECRETARIAT BUILDING. A recent progress photograph of this project now nearing completion on the East Side, New York City. Government departments in U.S.A. estimate that the total value of new construction in 1950 will equal the 1949 record of 19,000,000,000 dollars.

The American Industry

In the chapter on the American industry the Report states that under the American system of tendering the employment of a professional quantity surveyor is not required and that there is no differentiation between building and civil engineering contractors.

In the period between the two world wars, booms and slumps in the industry were more severe than in Britain, and in general the American industry has had to meet economic setbacks by its own unaided efforts in reducing costs and increasing efficiency. During the war the proportion of private work, as in Britain, was low, but by 1948 it had risen to 78 per cent. of the total work in hand.

The Report records a rise in unemployment to a figure of five and a quarter per cent. in the first half of 1948 and observes that both sides of the industry agreed that the state of the labour market has a considerable effect on individual productivity, as unemployment benefit for a single man varies from 13 to 25 dollars a week, compared with earnings when fully employed of 100 dollars or more.

Building is a more seasonal occupation in U.S.A. than in Britain. In 1939, while nearly half the workers were in reasonably regular employment, one-quarter were working half the year or rather more, and slightly under a quarter were either employed only irregularly or unemployed for the whole year, the overall average being about eight months' work per annum. Up-to-date figures were not available, but in Boston an estimate was given of 40 full weeks as the average craftsman's working year.

The Architect's Contribution

In architects' practice the Team was impressed by their thorough preparation for the job. The working drawings for any substantial building are considerably more numerous and more detailed than is customary in Britain. Large-scale constructional details, sufficient for intelligent bidding and for the purpose of correlating all parts of the work, are included in the drawings. In addition, minutely detailed schedules are prepared, and incorporated on the drawings, in respect of doors, windows, fittings and all finishings in order to secure clearer definition of the architect's intention than can be given by drawings and specifications alone, and to relate the drawings to the specification. The drawings are accurately and adequately dimensioned, and nationally-accepted standard symbols are invariably used.

Whenever possible, and certainly in all cases in which a lump-sum bid is required, all the working drawings, specifications and schedules are completed in respect of the work of every trade and specialist service *before tenders are invited*. Sets of the full drawings and specifications, including all relevant facts from the information supplied by the client to the architect, are issued to each tenderer, who, with full knowledge of the requirements of each trade, can tender more accurately. The contractor knows further that, once the work is begun, it will not be held up, possibly for weeks or months, by delay in receipt of the necessary drawings or instructions. In short, the contractor is given by the architect every item of information requisite for the complete and proper organisation of the job at the earliest possible stage.

It was emphasised to the Team in the

THE VETERANS' ADMINISTRATION HOSPITAL, NEW YORK. This recently completed hospital is on the Fort Hamilton military reservation in Brooklyn and has a 1,000-bed capacity. It is sited so as to provide the maximum sunshine to each room.

strongest terms by both architects and contractors that the early supply of complete and detailed information is a fundamental factor in securing speed of construction. The time required by the architect to assemble and prepare the necessary documents is more than made up by the rapid progress the contractor is able to make when the work begins. It would be unthinkable in America for a contractor to be instructed to send half-a-dozen labourers to a site to start excavating at a time when the final designs were no more than half sketched out in the architect's office, merely to satisfy the owner's desire to see work in progress.

Complaints by British contractors of delays in receiving architects' drawings and instructions are so widespread that the superiority of the American procedure cannot be emphasised too strongly. It is, moreover, one of the factors which, to a large extent, are in the hands of the architect.

The business-like attitude of the American architect to his profession is reflected in his office administration, which is usually more elaborate than in Britain and is organised to enable the procedure set out in the preceding paragraphs to be followed. In the offices visited, it was apparent that more complete accounts of office and professional costs are kept than is usual in most British offices, and, in general, the exact amount of the architect's costs incurred in respect of each individual contract could be ascertained immediately. Drawing-office equipment is generally superior and the filing systems, including the racking and bound sets of drawings and the referencing of catalogues, are also better.

There is no restrictive control in America over the volume of building work which may be undertaken, but the architect has to comply with such requirements in regard to design, standards of materials and construction, etc., as may be contained in the local Building Codes (or bye-laws) and the Zoning Codes (town planning). American architects would be appalled by the current British controls, which may require consultation with four or five Government Departments, possibly at both regional and national levels, as well as with a local authority, before any major building project can proceed beyond a tentative stage.

The American practice of thorough pre-planning facilitates the effective co-ordination and correlation of the work of the sub-contractors, which is one of the most striking features of American contract organisation, and enables sub-contractors to begin work at a much earlier stage than in Britain. The sub-contractors for plumbing, electric wiring, heating, etc., can come on the job shortly after the steel erection or reinforced concrete frame has been started. The mechanical services are frequently installed on bare floors, walls and ceilings, sometimes even before the outer walls are built. This is rendered possible by the particular care taken of work already in position by all contractors and their employees. Fittings fixed in advance were practically never damaged.

In plumbing pipes are never fixed on outside walls, and the high efficiency of American plumbing both in planning and fixtures merits more detailed study. Except in multi-storey buildings, where boosting is necessary, nearly every type of building has water supply direct to all fittings from the main, and meters are generally installed, storage tanks being unusual. The planning of the heating and ventilation services in every building is part of the original design. As a result the typical small house has almost no wasted or unused space. The advantages of extreme simplification and added comfort made possible by an inexpensive form of central heating are emphasised in the Report, which adds that the inertia of the average householder, the private builder, the local housing authority and the Government departments responsible for housing policy, has so far precluded what appears to be a substantial saving both in first cost and maintenance.

As an example of standardisation and simplification of building materials it is stated that 66 sizes of vitrified paving bricks regularly produced had been reduced to four.

In 1949, of 1,019,000 permanent non-farm dwelling units started, 983,700 were being built by private enterprise (96.5 per cent.) and 35,300 were publicly financed. War-time controls were abolished in 1947, and the industry has now got back to its pre-war average time of 3½ to 4 months for the completion of a housing unit, some low-cost private enterprise houses being completed in 10 weeks. While it is clear, the Report states, that public funds must be drawn on for the proper housing of the poorer classes, private enterprise house-builders claim that they can meet the needs of 55 per cent. of the population.

The majority of low-cost private enterprise houses seen by the team were selling at between 8,000 and 10,000 dollars, though in the South houses are being erected for sale at 4,500 to 5,000. The average cost of construction (as opposed to selling price) of houses begun in 1948 was 7,700 dollars. These low costs are achieved by extreme simplicity of design, the use of timber as the main constructional material and by reduction in size below what is normal in Britain. More houses are now being built for rental.

The Report discusses State aids to home ownership and public housing, and says that the cost of public housing represents a far smaller proportion of the national budget than in Britain.

Recommendations

The following are specific recommendations given in the report:

PRE-PLANNING.

(1) Establishment of full confidence between architect and client on a business basis and the definite settlement at an early stage of the client's requirements —particularly in the case of Government departments—so that costly and time-wasting variations in the work are eliminated and the speedier final settlement of accounts is facilitated.

(2) Preparation of designs which have regard to ease of construction and saving of cost, are based as far as possible on standard dimensions, and take into account types of material and equipment available.

(3) Completion, before the tender stage, of all essential working drawings, specifications and schedules, and their issue to tenderers as far as is necessary.

(4) Issue to the main contractor of all information necessary for letting sub-contracts and for the placing of orders with nominated suppliers immediately his tender is accepted.

(5) More careful selection and better training and payment of clerks of works.

CONTRACT ORGANISATION.

(6) Constructional work should not be started until the organisation of the job has been worked out to the most advanced stage possible. Pressure to

begin work on the site prematurely should be resisted

(7) The general contractor should regard proper co-ordination of sub-contractors as one of his most important functions.

(8) Simplified time and progress schedules should be circulated widely through the job, and to them all sub-contractors and any direct contractors should be required to conform.

(9) Sub-contractors responsible for the services should start work at an early stage and install fittings, etc., conformably with the progress of constructional work, care being taken, as in U.S.A., by all employees to preserve from damage work placed in position.

(10) Schemes for selection and training of supervisory staff should be reviewed.

(11) The use of appropriate costing systems.

(12) The encouragement of the maximum economic use of mechanical aids.

MATERIALS AND SERVICES.

(13) Adequate supplies of timber at a reasonable price. The use of unsuitable timber and substitute materials increases cost.

(14) The whole question of the quality control of concrete should be examined and, in particular, its specification by performance and quality, i.e., by compressive strength in lb. per sq. in., instead of by volume or weight. Other suggestions are for the use of transit mixed concrete in the major centres, of air-entrained concrete, and concrete blocks of suitable aggregates.

(15) Certain of the industries manufacturing building materials should consider sending teams to U.S.A.

(16) A further and more detailed study of American plumbing practice would be valuable.

GOVERNMENT DEPARTMENTS.

(17) Government departments responsible for licensing and for materials and other controls should continually review the possibility of relaxing or eliminating them; job organisation may be ruined by official requirements that certain materials are not to be delivered until the end of a particular licensing period.

(18) Removal of controls over the prices of basic materials with a view to their eventual stabilisation.

(19) Simpler and quicker procedure for the revision and unification of bye-laws.

(20) More energy-giving foods for operatives.

(21) Propaganda to inculcate safety-mindedness. Permission for the use of simplified and more economical forms of scaffolding might follow a further examination of American requirements and practice.

The Report urges the responsible authorities to take all possible steps to make available adequate supplies of essential materials, especially timber, and to ease or remove existing onerous restrictions on private enterprise housebuilding, for sale and rental. The American housebuilding industry, freed from all controls, can, it states, provide houses for a large proportion of the population at prices commensurate with their average annual family incomes.

Other recommendations deal with the settlement of intermediate and final accounts, the simplification of the Standard Method of Measurement and the apprenticeship system.

L.M.B.A. and Productivity Report

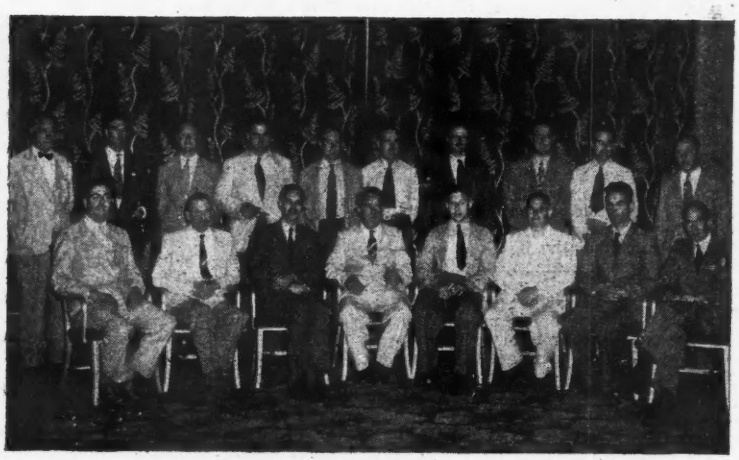
Active steps are being taken by the London Master Builders' Association to let its members know of the way in which things are done in the building industry in the United States, following the recently published report of the Productivity Team which visited America last year. The L.M.B.A. has arranged for Mr. N. S. Farrow, M.B.E., who was a member of the team, and who is a member of the L.M.B.A. Administrative Committee, to visit all its areas in turn and to address members on his impressions of the tour. A film on "Productivity," taken in the United States by members of the team, is also being shown. The first two of Mr. Farrow's addresses have already been given to Central No. 5 and Northern Areas and the next will be on May 24 to the South-eastern and Central No. 4 Areas at Chiesman's Restaurant, Lewisham.

COMPETITION NEWS

Coventry Cathedral Reconstruction.

The Coventry Cathedral Reconstruction Committee has pleasure in announcing the appointment of the following to act as a jury of assessors in the forthcoming architectural competition for designs for the new Coventry Cathedral and ancillary buildings: Sir Percy Thomas, O.B.E., LL.D., P-P.R.I.B.A., Mr. Edward Maufe, R.A., LL.D., F.R.I.B.A., and Mr. Howard Robertson, M.C., A.R.A., S.A.D.G., F.R.I.B.A.

The assessors were nominated by Mr. Michael Waterhouse, P.R.I.B.A., and the appointments have received the confirmation of the Cathedral Council and the Joint Council of the Cathedral Christian Service Centre.



THE BUILDING PRODUCTIVITY TEAM. *Left to right. Seated:* C. Douglas Calverley, Michael T. Waterhouse, M.C., P.R.I.B.A., C. Gordon Rowlands, Robert O. Lloyd, O.B.E., J. Patrick Bates, Wilfred Horsfall, William R. Johnstone, T. Cuthbertson Hill, F.R.I.C.S. *Standing:* Walter R. Cowen, Robert H. Matthew, A.R.I.B.A., Montagu H. Thackray, F.R.I.C.S., N. Stanley Farrow, M.B.E., Glynn Lloyd, William J. Clarke, Robert S. Gray, John H. McKechnie, Francis W. Beazley, William L. Padgett (Project Manager), E.C.A.

CORRESPONDENCE

The Working Party Report

TO THE EDITOR OF *The Builder*.

SIR,—I have been reading with interest your leading article of May 5, on the Building Industry Working Party Report, with which comments I am glad to find myself substantially in agreement. May I, however, refer to one sentence in it which I think does the Report rather less than justice, though, in my opinion, this is due to the use in the Report of an unfortunate phrase such as will inevitably creep in from time to time in a document of that length?

You were good enough to indicate that you are not altogether satisfied with the Working Party's conclusion "that nominated sub-contracting should be limited as far as possible." I should find myself heartily in agreement with this, but, on turning up paragraph 106 of the Report, I think it is clear that the Working Party's recommendation is a general endorsement of the findings of the Simon Committee. These findings are contained in Paper 4 annexed to the latter document, and in this sub-contracted work is divided into three classes:—

(a) The building crafts, including plumbing, plastering, painting, masonry, joinery, slating, tiling; (b) Constructional work, including structural steel framing, reinforced concrete, structural floors, etc.; and (c) Engineering services, including heating, lighting, ventilation, lifts, cooking equipment, etc.

The Simon Committee recommended—and the Working Party endorses its recommendations—that Class (c) and, in certain cases, Class (b) should be put out to nominated sub-contractors: but that in Class (a) the contractor should be responsible for sub-letting the work subject to the reservation (in the identical terms used in the Working Party Report), that "only in exceptional cases of highly specialised work should the architect nominate a sub-contractor or obtain separate tenders for the work."

I think, therefore, that it is clear, and that in fairness I should point out, that the Working Party's limitation of nominated sub-contracts to exceptional cases of highly specialised work only applies to the building crafts, such as plumbing, painting, joinery, plastering and so forth. Were it not so, I should echo most heartily the implication in your leading article upon which in the circumstances I hope I do not appear ungracious in commenting.

D. C. MALLAM,
Director, Federation of Associations of Specialists and Sub-contractors.
Dacre House, Arundel-street, W.C.2.

The Professions and Local Government

TO THE EDITOR OF *The Builder*.

SIR,—Having now re-read and had discussed my comment in last week's issue of *The Builder*, it is realised that a minority of the readers may not have had the opportunity to read the comment in its proper context, and it consequently needs explanation.

An architect serving on a local authority has emphasised that, as in his instance, the general practice is to adhere stringently to the idea of precluding serving members from being commissioned for works, and has created a situation whereby possibly one local authority is for and an adjacent authority against Council members being appointed. Surely this problem could be resolved by all the authorities allowing the same benefits to a serving member as to a private individual?

With this deterrent removed perhaps more of the younger, and we hope vigorous, architects and surveyors would be willing and able to stand for election, without having to forgo work for which they could otherwise be commissioned. This, we trust, would give the architectural and surveying professions a strong representation on local authorities, with the possible effect of more appointments for the private man—surely whether for himself or for his colleagues being of no immediate consequence; it would ensure that his time would be well used for the benefit of the private practitioner, quite apart from the multifarious and onerous duties which already fall on councillors.

L. C. PATTERSON, A.R.I.C.S., A.I.Arb.
11, Cathedral-road, Cardiff.

Wall Ties in Cavity Walls

TO THE EDITOR OF *The Builder*.

SIR,—The answer to the inquiry of "F.R." in your issue of April 7 is incorrect. Ties spaced at 3 ft. horizontally and 1 ft. 6 in. vertically are at the rate of two ties per yard super. This is easily seen if one draws a "yard" so that its corners do not come at a tie.

The number of ties per yard super. can be doubled quite simply by doubling the horizontal spacing, i.e., placing ties 1 ft. 6 in. apart horizontally and vertically and staggering alternate rows.

D. D. YEOMAN, A.R.I.C.S.
Beaufort House,
Gravel-lane, E.1.

IN PARLIAMENT

Private Building Licences

ON May 4, replying to a number of questions, MR. BEVAN, Minister of Health, said he had considered the provision which ought to be made in the programme for houses to be built for owner-occupiers under licence. Experience had shown that in very many districts the claims of those in the most urgent need of houses made it necessary that at least nine-tenths of the houses built should be Council houses. In other districts, however, those in the most urgent need of homes might include a greater proportion of persons who wished to build a house for their own occupation. Each authority should consider for itself, among those decided to be in the most urgent need, the numbers and needs of the two types of applicant. In order to enable each Council to take account of the circumstances of its district he had decided to restore to housing authorities the discretion to issue licences up to a mixmum of one-fifth of their allocation where they were satisfied that this was justified by the needs of the applicants. He was prepared to consider, exceptionally, applications from local authorities for permission to exceed the figure of one-fifth where he was satisfied that this course was necessary in the light of the evidence submitted to him as the proportionate numbers and needs of the applicants for Council houses, and of the applicants for licences.

It sometimes happened that an applicant living in one district desired to move to another district and to build a house there for his own occupation; by this means a better distribution of housing might be brought about by the release of the house in which he at present lived. He was ready to authorise arrangements for making licences mobile, and to agree in such cases that a licence could be issued by the authority in whose area the house was to be built, on the understanding that the licence would be chargeable against the quota of the authority for the district in which the applicant at present lived. A circular was being issued to local authorities.

MR. BRAINE: While admitting that this is a step in the right direction and, in congratulating the Minister on accepting advice from the Opposition, may I ask him whether he is aware that in many districts the ratio should be nearer 1 in 2 and that this arrangement that he has announced does not go far enough?

MR. BEVAN: If the Hon. Member had listened carefully to what I said, he would have heard that I am trying to make the arrangements as flexible as possible in order to meet the varying needs of the different districts in various parts of the country. There are some areas where hardly any licences are required and there are other areas where a higher proportion is required. That is why this arrangement will give greater flexibility.

MR. MARTIN LINDSAY asked why it had taken the Minister five years to agree that this degree of flexibility was necessary; was he aware that had this been done at a much earlier stage they would have had many more houses built already?

MR. BEVAN: The Hon. Member will appreciate that the substance of what I have said merely restores the one in five ratio to where it has been almost for five years. Furthermore, the relaxation is now possible because in very many districts the provision of houses has met the needs of a very large proportion of the inhabitants.

MR. ELLIOTT asked whether the total allocation of houses was to be increased or whether this was to be simply a reshuffle of the already too scanty allocation which he had already allowed.

MR. BEVAN said what he was dealing with at the moment was how to share the available housing programme among various types of applicants.

MR ELLIOTT: Do I understand that this means no total increase in the housing programme?

MR. BEVAN: The housing programme is what was announced by the Chancellor of the Exchequer in his Budget statement.

MR. GIBSON: Is the Minister aware that what he has just said about this change will not be welcomed wholeheartedly in all parts of the House? When he is considering applications for more than the one-in-five, will he bear in mind the situation in those towns where private enterprise has never taken up its full allocation?

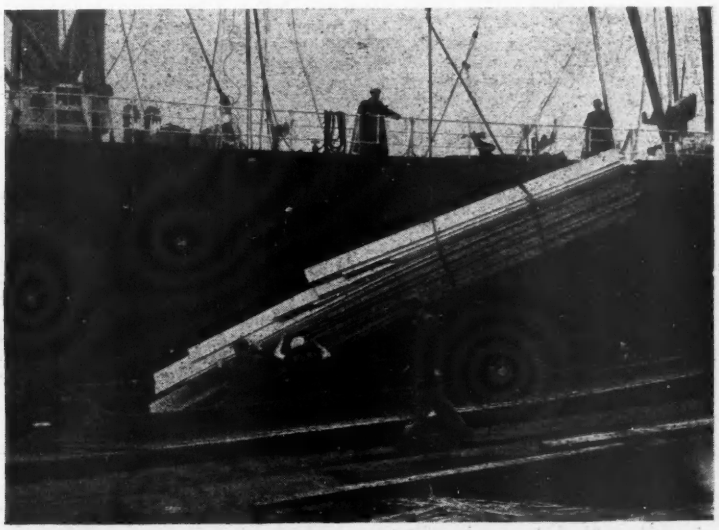
MR. BEVAN: Of course we shall take that into account. As I said, this will occur only in very exceptional areas. I am not expecting to have to concede very many of them because over most parts of the country the demand is still for houses to let.

MR. DEEDES: Having reached this decision, will the Minister do everything he can to ensure that the long delays between the application for private licences and their fulfilment are reduced as far as possible?

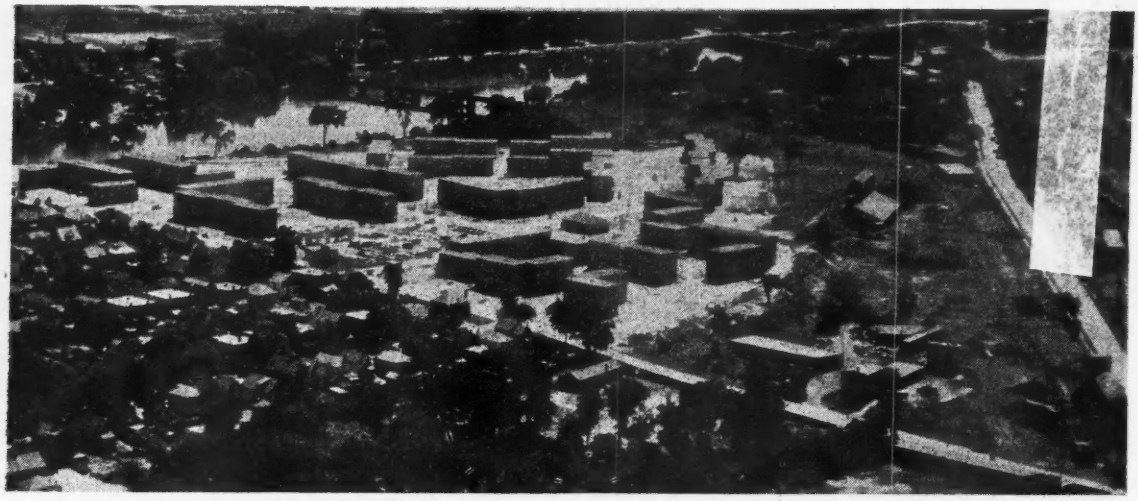
MR. BEVAN: In view of the fact that we have always been charged with putting more houses into production than the physical capacity of the industry can bear, there can hardly be complaint against the administration for delay.

MR. R. S. HUDSON: Do the conditions which the right hon. Gentleman has announced apply also in the rural areas to farmers who wish to build cottages for their workers?

MR. BEVAN: Of course.



DOUGLAS FIR FROM BRITISH COLUMBIA being unloaded from the R.M.S. "Loch Ryan" at the Royal Albert Dock, London. The timber was donated to the Timber Development Association by the British Columbia Coast Woods Trade Extension Bureau, and the Association in turn has presented it to the Festival of Britain Authorities. The shipment totals some 42 tons, and the wood is to be used for the construction of the huge laminated arches which have a height of 52 feet and a span of 101 feet, to be erected at the Waterloo entrance to the Exhibition on the South Bank.



The Mann-avenue project, Ottawa.

BUILDING PROGRESS IN CANADA

Opportunities for U.K. Manufacturers and Producers

By HENRY B. BEES

UNPARALLELED prosperity has been the keynote of Canadian business during the past five years, and the construction trades are still enjoying the greatest building boom in the economic development of this new country. Some experts announce that the peak of this rush to construct new buildings has passed, that it came in 1949, but facts seem to point to a bigger year than ever in 1950, once the weather, decidedly unfavourable at present, allows operations to begin in earnest, while the Employment Agency (Government) expects that by the summer season skilled help will be as scarce as in former years.

Since 1945 the amount spent on construction work in Canada has increased annually by about 25 per cent., and there is at present a housing "carryover" from 1949 of 50,000 housing units, most of which will be rapidly completed as soon as weather permits. To find solid examples of the current upswing in construction, we have only to turn to the Canadian cities. Phenomenal expansion is going on in Edmonton, where nearly 4,000 houses were completed and started in 1949, topping the 1948 total by over 1,000 units, while C.M.H.C. officials there estimate that this record will be broken in 1950 by another 300 or 400 units. Calgary building, too, reached a new peak last year, as did Winnipeg's, for in the latter city new homes rose from 1,075 in 1948 to 1,241 in 1949. Building permits for the city of Winnipeg this year have so far amounted to over 2,300,000 dollars, and include five apartment blocks and a new Young Men's Hebrew Association headquarters; permits for houses in St. Boniface and the Winnipeg suburbs are also breaking records.

"No effect without a cause" is a trite but true axiom, and it has been estimated lately that there are nearly half a million families in Canada without proper housing. In the "hungry thirties" which many recall with some bitterness, very little building was done, for obvious reasons, and in 1949 there were upwards of 10,000 families still in "emergency shelter" of some kind, varying from empty public buildings, hurriedly adapted for family use by hard-pressed authorities, to squalid, rickety tenements in city slums, many of them condemned by health authorities but still tenanted because of housing shortages. Displaced persons from Europe and other immigrants have totalled over 50,000 since the war, and from 1945 to 1948 the marriage rate (formation of new families) was always ahead of the building rate, though the latter climbed in front for the first time in 1949.

Prices of Materials.

The prices of building materials are still high. Timber, of which there is now the best supply for many years (city timber yards are now filled to capacity), has shown no inclination to drop in price; in fact, an advance of 10 per cent. in general prices was lately noted. Wages are still at an all-time high, and with the cost of living at record levels there is little chance of any great change in this direction. Other building supplies, including bricks, cement, cinder-blocks and tiles, have followed the general price trend, as well as metal lath and insulation materials of all kinds.

The acute housing shortages in most of the Canadian cities have been partially met by the federal government (in co-operation with local authorities) in developing new residential sites, which are now in various stages of completion. A notable scheme is the one at Westmount, near Halifax, which utilises the former Chebucto airstrip. Over half the project has been completed and the houses either sold to veterans or leased to personnel of the Department of National Defence. To speed up the work on these houses a main supply depot on the site has been converted into a "mill" where all joists, studs, sheathing and rafters are pre-cut and stored for use as the building operations progress. The Mann-avenue project, at Ottawa, built by the Federal Government for rental to war veterans, comprises 24 blocks of 64 buildings divided into apartments. In addition, a central shopping store and schools will soon be added. Vancouver, B.C., has two of these residential projects, Renfrew Heights and Willingdon Heights, both intended primarily to house veterans and their families. Willingdon Heights, Canada's first and largest integrated housing project, containing 600 units, has cost 3,500,000 dollars and is situated on high ground overlooking the city of Vancouver. It covers an area of 115 acres. The property was purchased early in 1947 and already an attractive one-block shopping centre has been built, with drug, grocery, dry goods, shoe repair stores, lunch counter and bakery concentrated under the same roof.

A primary school and a high school have also been added, and a new community hall will be begun very shortly. Renfrew Heights, which early in 1948 was just a name on a west coast engineering project, is located in south-east Vancouver, and provides homes for 600 veterans' families at reasonable rental rates. In two short years the contractors, builders and suppliers have combined to produce an outstanding post-war residential development. In addition to the houses themselves, schools, churches, a commercial centre and parks have now been planned to make the new 120-acre community a self-contained unit. As in others of these large residential projects, mass-production methods have been used where possible. The typical Renfrew Heights home is a two-bedroom bungalow with an exterior finish of stucco and a cottage-type roof, with the wide-eave overhang which is the popular style in the Far West.

Prefabricated Housing.

One outstanding feature of the new homes is the prefabricated type of house, which can be erected in a day by an experienced gang. Made to precision measurements in special jigs, under factory conditions, they can be easily transported on flat trucks to a building site. To obtain one of these dwellings all the customer needs to do is to produce the down payment (around 700 dollars in cash), sign a contract for the balance, and leave the rest to the company, who will purchase the site, erect the "prefab," and invite the owner to finish the

interior as he desires. Some are placed on concrete blocks and others on a proper foundation with a basement. North American Lumber, of Winnipeg, who produce these prefabs, are this spring doing a brisk business with eager buyers. Some sales of these dwellings are being effected with the Hudson's Bay Company, who find the type very suitable for their trading posts in the Far North, where skilled help is scarce but other labour easy to obtain.

Despite all this constructional progress, however, not all of the rows of new houses erected in suburban districts by private enterprise are pleasing to the eye. A few builders have built long rows of houses identical in shape and size, with but slight variations in elevation and colouring. Frankly, they tend to resemble rows of chicken-coops. Moreover, under the pressure of war-time scarcities in materials, Canadian cities built tiny, cheap homes, using third-class timber, full of knots and badly finished. In many cases these have already fallen into poor repair and constitute a growing problem. They are hard to sell, and renters are by no means satisfied to live in them, for mostly they have little floor space, no basements, and few conveniences.

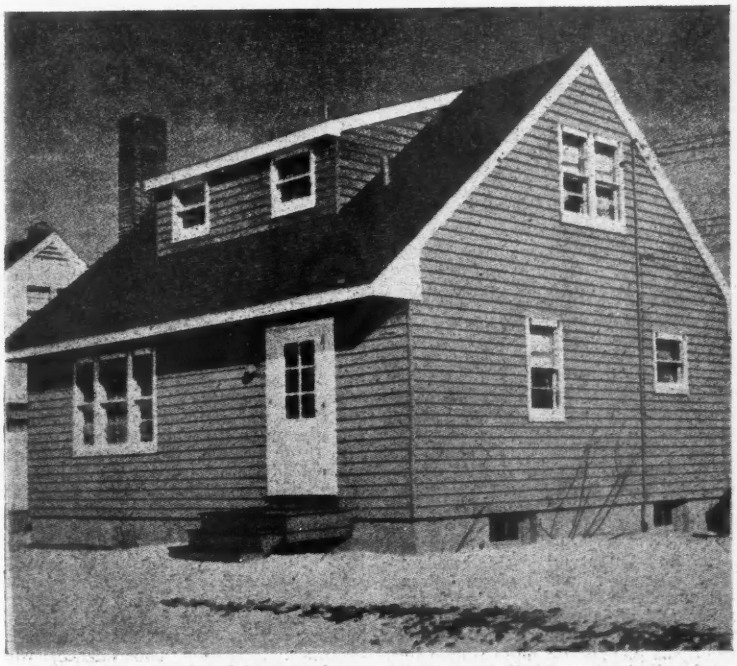
The most popular type of home sells in Winnipeg for about 8,000 dollars, and is equipped with hardwood floors, small kitchen with built-in cupboards, two bedrooms (with wardrobe cupboards) and a bath on the ground floor, all finished in plaster.

The basement is sturdily built of reinforced concrete, and water pipes are now mostly of copper. The most common heating unit is a small coal furnace, often equipped with electric blower to force the heat where wanted, a most efficient way of utilising the heat produced by the coal. Being a one and a half-storey house, two bedrooms may be added upstairs to accommodate larger families for an extra charge of 850 to 1,000 dollars. Real-estate agents find these houses more difficult to sell than formerly, for nowadays prospective buyers with the necessary cash to lay down are becoming much fewer but, as a matter of fact, most of the houses are sold even before they are finished.

Some new ideas in housing are being tried out. An interesting example is the "radiant-heat" type of bungalow, the windows of which extend horizontally and do not open, ventilation being carried out by louvres of wood (which can be closed by shutters) on both sides. The entire floor of the house is one slab of concrete, in which are embedded a series of spaced copper tubes about ½-in. in diameter, connected with an oil-burning furnace to send steam through the concrete block to heat the house. A special small room has been allowed for the furnace. The living-room floor has a felt covering, and for the rest the buyer lays down linoleum. Such a housing unit requires no furnace pipes or registers, and is in this respect very convenient. A number of these has been erected as a project in the River Heights subdivision of Greater Winnipeg.

Houses of Cedar Wood.

Another new departure from the usual system of house construction in Canada has appeared in numbers in British Columbia, where timber, being a local product, has dropped in price somewhat, and can now be obtained in the best grades. Solid cedar planks, either two or three inches in thickness, are used for the walls instead of the ordinary "two-by-four" and board style of building. These planks are V-shaped at the bottom edge and shaped like an inverted V at the top, thus ensuring a good joint, and are said to give a very cosy home when finished. Besides the novelty of this kind of construction, the chief appeal of the solid plank walls is the combined ease of fitting, the saving of man-hours, and the consequent reported saving of 16.6 per cent. of construction costs. While probably very suitable for the mostly mild British Columbia climate, it would appear that the walls would need further insulation to suit an extreme climate such as that of the prairies.



A typical 1½-storey house, of frame construction.

Heavy Construction.

The most noticeable change in the building programme for 1949 was the amendment to the Building Act of 1944. Late last year the Dominion Government, in order to expedite the sales of housing units, reduced the down payment required to 10 per cent. of the total cost of the house. This has certainly accelerated the selling side of the business. Suggestions were even made to abolish the down payment altogether, giving the tenant a lease at a moderate rent, which would partially apply on the principal and give the lessee a substantial equity in the house. Government authorities at Ottawa are, it seems, agreed that there is a pressing need for low-rental housing, but are not prepared to undertake the business themselves. However, they have offered to guarantee a maximum of 75 per cent. of losses incurred in this class of development, if the Province where the buildings are erected will take responsibility for the other 25 per cent. The large insurance companies, possessed of large sums of money which, to some extent are lying idle, have been willing to invest money in this class of housing, but when they asked for tenders on large low-rent projects, they found contractors so busy on their own account that no tenders were available. However, it is fairly certain that these large concerns would speedily invest money in schemes like these if any signs of deflation should appear, for it is obviously to their advantage to keep money in circulation.

The overall picture for 1950 also includes some "heavy" construction involving building operations. The Alberta-Superior pipe-line, already under construction, will need a series of five pumping stations along the route from the Turner Valley through the prairies and leading to a gigantic 7,000,000-dollar oil refinery to be located some five miles to the north of Winnipeg at East St. Paul, and will be sponsored by the Imperial Oil Company of Canada, a subsidiary of Standard Oil. The city of Toronto, to avoid traffic congestion, intends carrying out a big subway project this summer. In Labrador, the development of titanium and iron ore by American capitalists will call for considerable building there. Hydro-electric construction in Ontario, which is expected to check the growing power shortage in that province, will bring about the partial by-passing of Niagara Falls, and will be the "biggest yet" in its class. Work is now in progress on the three-miles long channel. Also British Columbia is planning an aluminium hydro development of some magnitude, to be carried out this year.

Opportunities for British Firms.

British firms may well inquire: "What are the opportunities for building materials from Britain in the Canadian market?" A realistic answer is that the picture has changed already from last year; from an age of comparative scarcity, there is now a good supply in most lines, and the market is now becoming highly competitive. No longer is it necessary to delay projects for want of materials. There exists a strong sentiment, in the West, anyway, to "Buy British" if possible, but, unfortunately, there is little sentiment in business. British goods have, as ever, an enviable and well-earned reputation for quality and reliability, but uncertain shipping dates are in some cases losing trade for the British, for builders cannot wait for slow deliveries. The ideal situation would appear to be for the British manufacturers concerned to build up stocks of their own in Canada, from which they could control

to some extent the selling prices. Retailers have been too prone to take advantage of the label "British" to reap large profits, which in turn slow up sales. Hustling manufacturers in the U.S., Britain's chief competitor, employ highly paid industrial artists who constantly check the designs of nearly every article of hardware, even to the catches used on window sash, to streamline the product and increase its sales. To use a concrete example of the way the markets are going: In 1947 Canada imported 20,000,000 dollars-worth of machine tools from the States, but only one million dollars-worth from Great Britain.

In a list of different lines of construction material imported into Canada last year (1949), in only two cases, those of common window glass and earthenware tiles, did British imports exceed those from the United States. Yet there are many lines where, if British manufacturers could meet the American prices on a competitive basis and guarantee prompt delivery of the goods, they could certainly obtain large-scale business. Certain building materials, such as cement, clay, and gypsum products, are still in short supply, and are expected to remain so during the current year. Items made of steel, such as pipe and galvanised sheet, are also difficult to obtain at present. Other commodities which are only in fair supply, but on which deliveries are expected to improve, are sanitaryware and vitrified clay products.

Metal lath of the expanded type, ¼-in. and ⅜-in. mesh, is now used widely in Canada for plaster ceilings, solid and hollow partitions, and wall linings, also for stucco, a very popular finish for both city and country homes, since it is easy to apply and uses local materials. Tubular scaffolding, now coming into wider use for repairs and reconstruction of old buildings, is certain to increase in demand, as it reduces time and transport costs. Fractional-horse-power motors, for the powering of hand-tools, should sell readily, since the widespread use of electricity makes them standard equipment in all parts of the country. Air compressor units for paint sprayers, or for riveting hammers in connection with large buildings of the girder type, are commanding a ready sale. Special types of tools, improvements on the old standard patterns or made of more suitable materials (e.g., digging or hand-shovels of tough aluminium) should sell in quantity. Since the construction of Government buildings of a larger kind, at present shelved, is gradually being reintroduced, this would naturally require hoisting equipment. Building materials of a cellular type to withstand extremes of cold and heat, are finding new and expanding markets here.

Regarding paints, which have climbed very high in prices compared with pre-war, there should be an opening here for British manufacturers, in view of the fact that the raw materials have halved in price, while retail prices are still high. For the better grades, however, the market is for attractive shades of colour only, for interior finishes, which means that retailers would lose on unpopular colours.

BUILDING IN SOUTH AFRICA

The Problem of High Costs

From a Correspondent

THE most important problem facing the building industry in the Union of South Africa is that of high costs. In this respect it can be argued that the industry is at no greater disadvantage than most others in the Union, but the large programmes of school and hospital construction, bridge building and factory development in prospect, to make no mention of an ever-expanding housing programme, have brought the industry very much before the public eye in recent months, and the result has been a great deal of bitter and often ill-informed criticism.

In point of fact, building has only kept pace with the increased cost of living in the Union and increases in the cost of housing, for instance, have reflected no more than the general rise in the prices of materials and the cost of labour.

Basic building materials produced in South Africa by native labour, such as bricks, crushed stone and cement, have risen in price due, almost entirely, to increases made in native wages during the past ten years at the special requests of the Department of Labour.

It is true that land values have jumped considerably in recent years, but this hardly affects the cost of building, except in the minds of those members of the public who appear unable to distinguish between building costs and selling costs.

Taking minimum rates as a basis, labour costs in the major centres of the Union have increased since 1939 by more than 100 per cent. in the case of unskilled labourers, and by about 66 per cent. in the case of craftsmen. Moreover, a general shortage of labour has resulted in the average actual rates paid being, until more or less the end of 1949, considerably higher than the minimum rates prescribed.

Intermittent supplies of materials and the consequent uncertainty of deliveries have also contributed to wastage and an increase in final cost, while devaluation has tended to harden prices of some materials where reductions might have been possible.

These factors, well known as they are to the industry, do little more than add to the bewilderment of the ordinary citizen, who finds it impossible to acquire a home of his own owing to the cost being beyond his means. Mr. J. G. Carinus, Administrator for the Cape Province, opening the 44th annual congress of the National Federation of Building Trades Employers in South Africa, at Muizenberg, last October, described the situation when he said: "Houses of their own are becoming a luxury which few can enjoy; not even the builders. We must do something to put this state of affairs, this lack of balance, right, even though it is a most difficult thing to do."

Reduction in Standards.

As it seems highly improbable that post-war conditions of employment will be allowed to recede to the pre-war level the only possible solution to the costs problem is a reduction in building standards. Builders, architects, contractors and suppliers have made it clear that they can hardly be expected to reduce costs when the costs themselves are beyond their control, and some students of building advocate that prospective home-owners be prepared to accept smaller homes and fewer and less elaborate fittings. The elimination of an entrance hall, curtailed verandahs, fewer windows, lounge and dining-room combined, electric plugs in fewer rooms, fewer garages, bathrooms planned on more simple lines and the elimination of built-in cupboards —these are among the suggestions made for reducing housing costs.

A tendency which developed during the war, and has been given impetus since, makes an interesting aspect of the costs problem. It is the tendency to debit against building what should properly be a charge on furnishing. For instance, built-in cupboards, while saving the cost of wardrobes, put up the price of a house considerably and probably cost the owner more than it would have cost him to equip the house with wardrobes, owing to the fact that whereas the latter are mass-produced, the former are not. So it is with light fittings. Before the war there might have been one light fitting to a room and one plug to a house. Now demands are made for several lights in a room, a light point over each bed and a plug in each room. At one time one servant's room was sufficient. Now two are usually demanded. Not all pre-war houses had laundries. Most of the post-war houses have. One garage, or no garage at all, was the pre-war order of things. Few post-war houses of any size are built with fewer than two garages. Few double-storeyed houses to-day are complete in the eyes of their owners if they have only one bathroom. Before the war bathrooms, lavatories, and kitchens were either untiled or were tiled to a height of 4 ft. To-day a height of 7 ft. 6 in. is demanded. A sink, a bath and a hand-basin were previously all the accessories built into the kitchen and the bathroom. Now hand-basins in each bedroom are not uncommon. American kitchens costing as much as £400 are built in and bathrooms are larger and more ornate and elaborately equipped than ten years ago.

Unsatisfactory though the position is regarding houses for owner-purchasers, the native housing situation is even more serious, and the Government has decided to hold employers responsible for a contribution towards the cost of housing their native employees, contending that employers must assist in relieving the State and local authorities of the heavy burden of having to provide housing.

Training Native Labour.

As the result of an agreement reached some months ago between the Minister of Labour and the building trade unions, a Native Building Workers' Bill has been prepared which provides for the training of natives only to the standards required for the construction of buildings for use by natives in native areas. A maximum period of four years' training is visualised, which may consist of a period of training in an approved institution or a period of employment with a designated employer. A register will be kept of all native learners and workers.

The Bill is intended to serve the dual purpose of reducing building costs and enabling the Native to earn a higher remuneration in a more productive employment. The Bill has the support of the building employers.

A conference, to have been held under the auspices of the National Development Foundation in Johannesburg in February last, to discuss the high cost of building in the Union, was postponed in order that a consolidated research report might be prepared to facilitate discussion, as well as to assist the conference to come to practical conclusions. The postponement has caused disappointment in several circles, where it is genuinely hoped that the research report, which is expected to give an analysis of factors influencing building costs, design, methods and materials, legislation and finance, will not be long delayed.

CONANT HOUSE, SOUTHWARK, FOR THE SOUTHWARK B.C.

HOWES AND JACKMAN, FF.R.I.B.A., ARCHITECTS

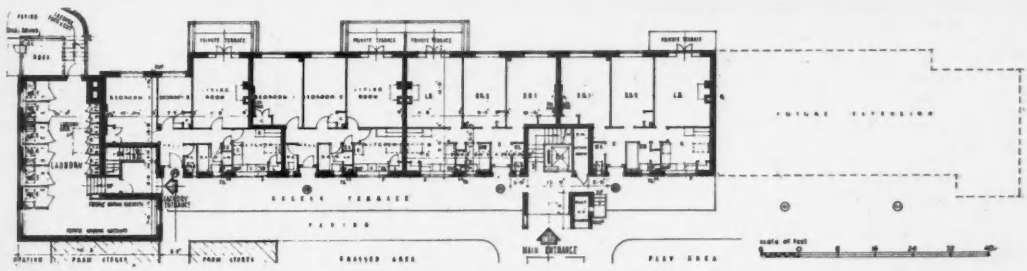
THE site faces Kennington Park, the largest open space in or near the borough, and a high block of flats has been planned opposite the park, giving the residents of the upper floors wide views over Central London. The present scheme, which it is hoped to extend at a later date, consists of two blocks, one of seven storeys, the other of five, containing 76 flats in all; of these flats two will have one bedroom, 46 two bedrooms and the remainder three bedrooms. The 56 flats in the larger block have principal rooms facing Kennington Park.

The accommodation in each flat consists of living-room, dining-kitchen, bedrooms, bathroom and separate w.c., and each has a private balcony, fitted with a window-box, with access from the living-room. The kitchen, which is supplied with both gas and electricity, is fitted with a larder, sink, cooker, refrigerator, broom cupboard, copper (if required) and store cupboards. Fuel storage is provided in each flat, with an external delivery hatch. A gas or electric fire is fitted in the principal bedroom. Each bedroom has a large wardrobe cupboard and there is a heated linen cupboard in the bathroom. Living-rooms are wired for radio diffusion by British Relay Wireless, Ltd. Perambulator and cycle stores are provided.

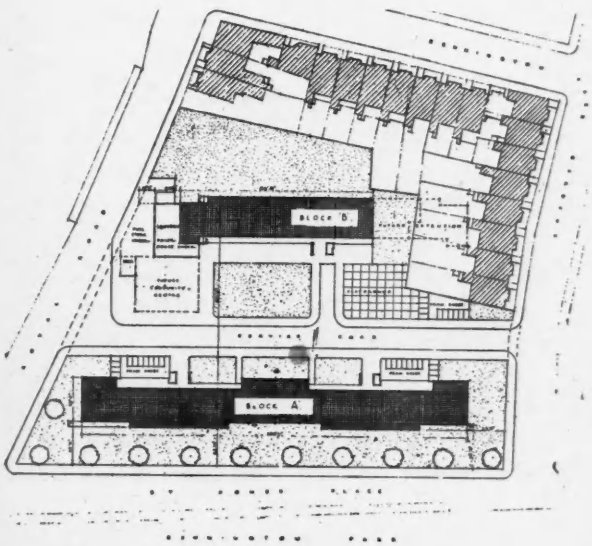
The seven-storey block is constructed with a steel frame and 11-in. cavity brick walls, the outer skin of the cavity being carried on concrete nibs projecting from the beams at each floor level. The floors are of hollow tile construction, the living-rooms being boarded and the bedrooms finished in Semtex composition. Each flat is supplied with hot water from a central boiler house, equipped with coal-fired boilers with automatic feeds, and of sufficient size to supply this estate and its future extension. On the ground floor is a laundry, equipped with "Bendix" automatic washing machines and gas-heated drying cupboards. Two lifts are installed in the seven-storey block, and one in the other, access to individual flats being by means of balconies. The bills of quantities were prepared by Messrs. E. C. Harris and Partners. The general contractors were Harry Neal, Ltd., 117, Baker-street, W.1. Sub-contractors and suppliers were:—

Steelwork, Redpath Brown & Co., Ltd.; fire-resisting floors, Caxton Floors, Ltd; facing bricks, Tucker & Son; metal windows, Rustproof Metal Window Co., Ltd.; artificial stone, Stuart's Granolithic Co., Ltd.; floor finish, Semtex Flooring, Ltd.; fireplaces, W. N. Froy & Sons, Ltd.; sanitary fittings, J. Bolding & Sons, Ltd.; built-up roofing, Neuchatel Asphalte Co., Ltd.; architectural metalwork, George Wright (London), Ltd.; lifts, Keighley Lifts, Ltd.; hot water installation, G. N. Haden & Sons, Ltd.; and kitchen fittings, Peerless Built-In Furniture, Ltd.

Part elevation to courtyard of block A.



Ground-floor plan of block B. *Below:* Block plan.



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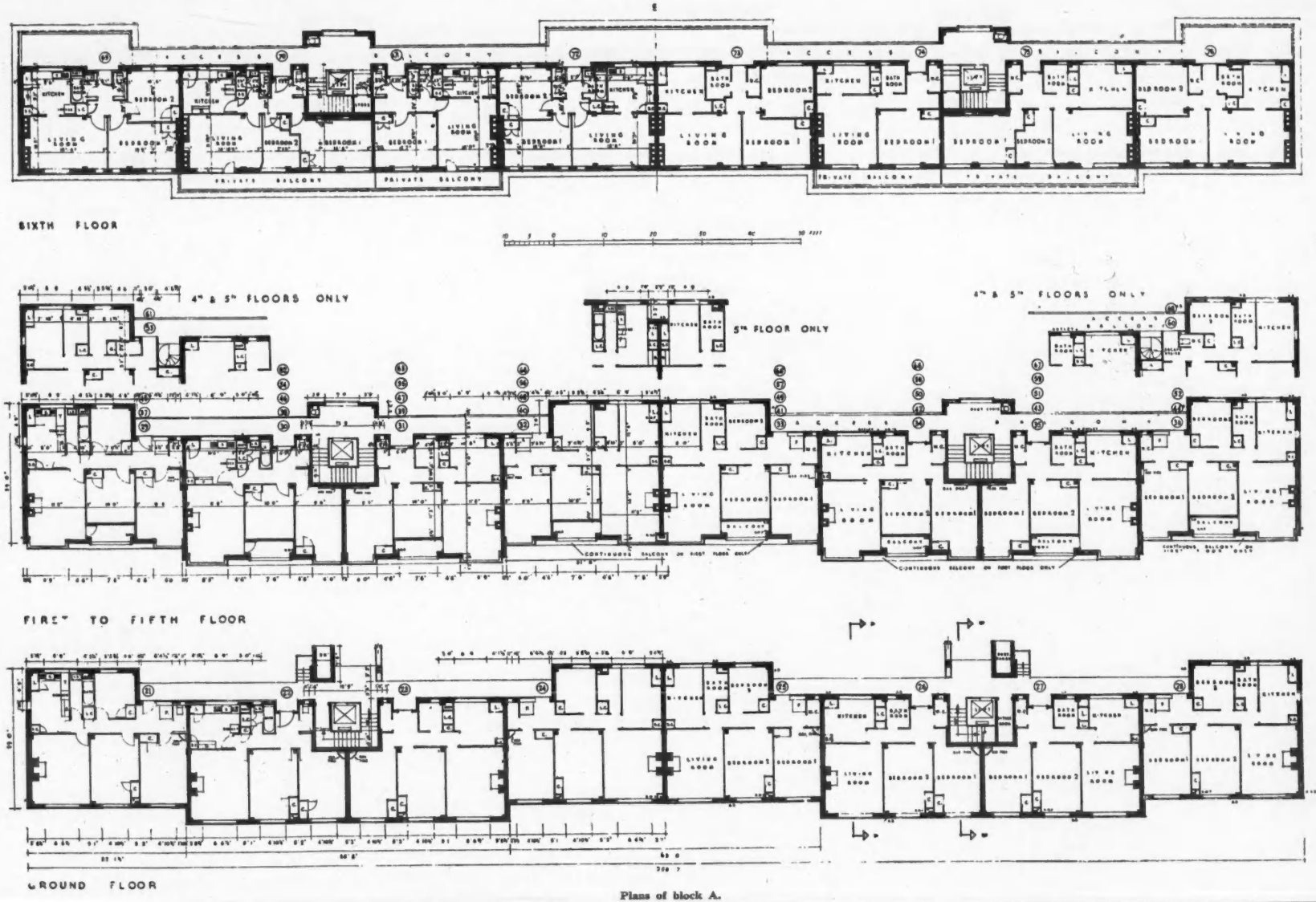


Plans of block A.

GROUND FLOOR

Plans of block A.

CONANT HOUSE, SOUTHWARK. Elevation to Kennington Park.

Entrances to main ticket hall and institute.

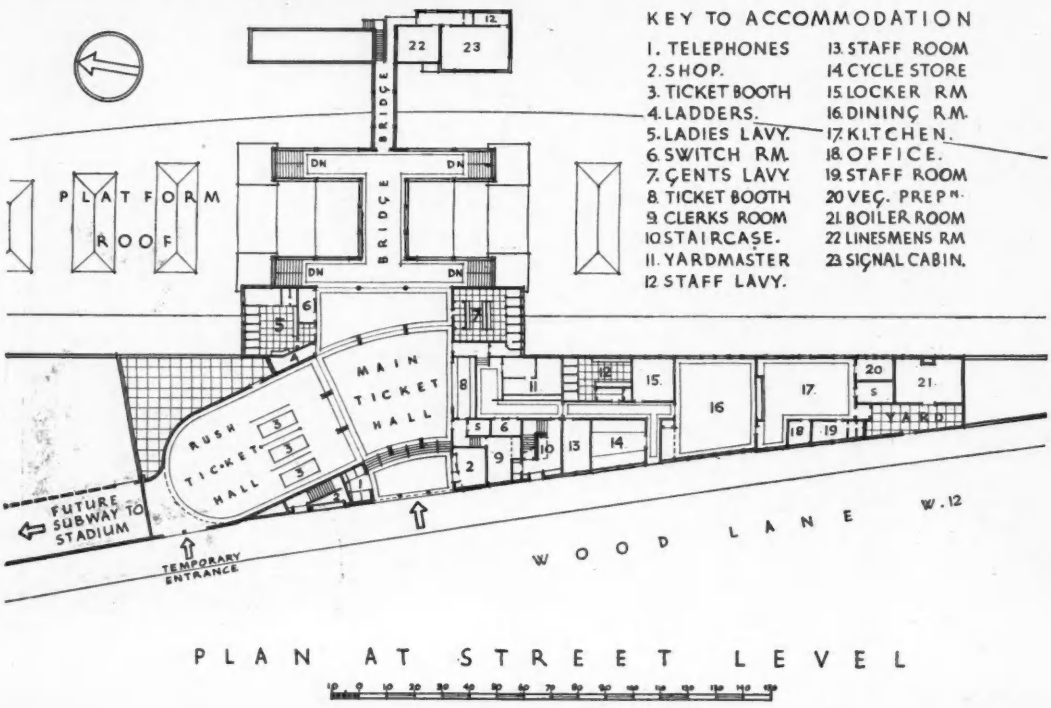
STATION at the WHITE CITY

A. D. McGILL, A.R.I.B.A.,
SECTION ARCHITECT
with
K. J. H. SEYMOUR, A.R.I.B.A.

THOMAS BILBOW, F.R.I.B.A.,
ARCHITECT TO L.P.T.E.

THE architects' problem here was to design a ticket hall which could deal adequately with the normal traffic, and also cope with the huge crowds which use this station when greyhound racing or athletic meetings are held at the stadium. The hall, therefore, resolved itself into two parts : the first, for normal traffic with a wall-type ticket office, and the second for rush-hour traffic leading direct by subway access to the stadium. This second hall is provided with a battery of ticket booths, and can be closed off from the main ticket hall in non-rush hours, by collapsible gates. As train crews are changed at this point, a yardmaster's office and canteen were required, the opportunity being taken to provide for a staff institute on the first and second floors.

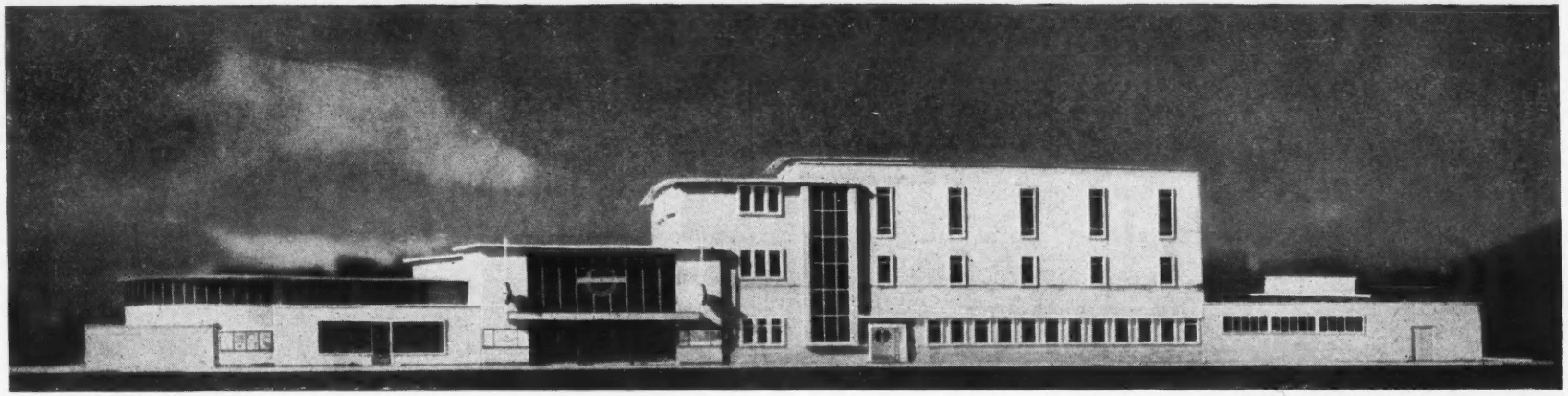
Construction.—Steel frame construction is used throughout, and floors and roofs are of precast concrete slabs. Facing bricks are silver grey and buff multis ; the platform surfaces are finished with asphalt and the floors to bridge and ticket halls with 12 in. by 12 in. white concrete tiles. The walls of the ticket halls will be tiled up to



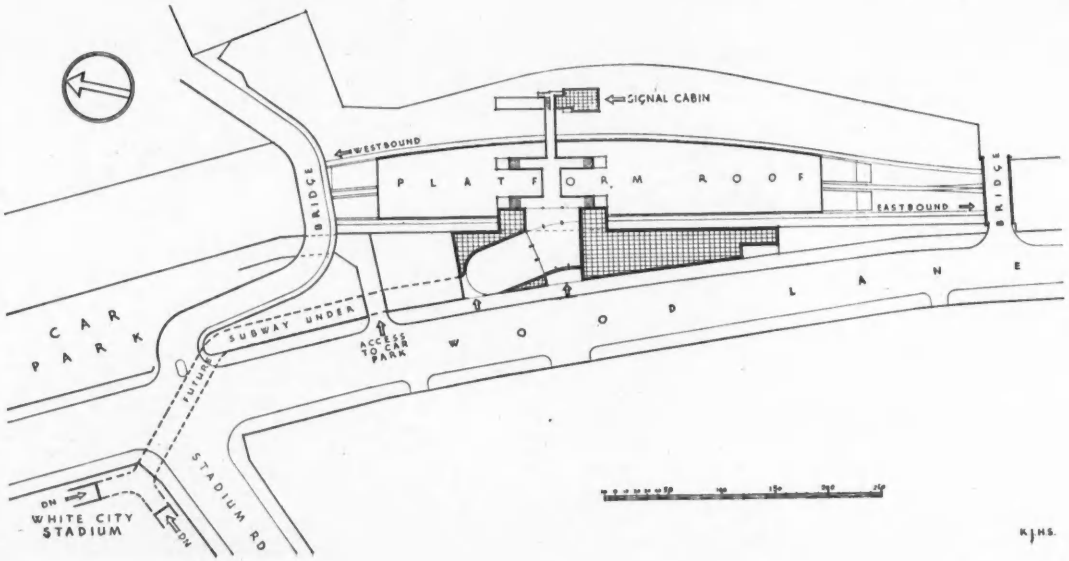
PLAN AT STREET LEVEL

Rush ticket hall from main ticket hall, showing way out to the stadium.

Main ticket hall from main entrance.



The station as it will be completed (from a model).



The layout.

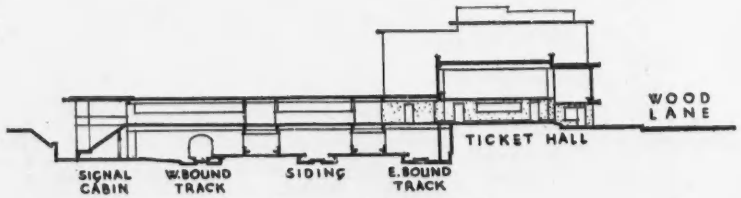
The staircase to institute.

door height in 18 in. by 12 in. faience slabs with facing bricks above and

Mr. A. D. McGill, A.R.I.B.A., section architect, assisted by Mr. K. J. H.

Staff canteen.

STATION AT THE WHITE CITY FOR LONDON TRANSPORT



Cross section through ticket hall.

door height in 18 in. by 12 in. faience slabs, with facing bricks above, and concrete ceilings will be left exposed and decorated. Windows are of metal casement sections. Fluorescent lighting will be installed on platforms, staircases, bridge and in the ticket halls.

Progress.—The first stage of the building programme was completed when the station was opened for traffic on November 23, 1947, and included the platforms (unroofed), staircases, bridge and temporary ticket hall, staff rooms and a public lavatory on the site of the stadium ticket hall. The platform roofs, main and rush-hour ticket halls, permanent staff rooms, permanent public lavatories, yardmaster's office and canteen are now completed along with a portion of the institute on the first floor. The remainder of the institute on the first and second floors has still to be carried out. The model illustrates the complete scheme but a further provision has been made in the foundations and stanchions for extending the superstructure over the ticket halls.

The scheme has been prepared by Mr. A. D. McGill, A.R.I.B.A., section architect, assisted by Mr. K. J. H. Seymour, A.R.I.B.A., under the general superintendence of the Board's architect, Mr. Thomas Bilbow, F.R.I.B.A. The general contractors were Messrs. Haymills (Contractors), Ltd. Sub-contractors and suppliers were :

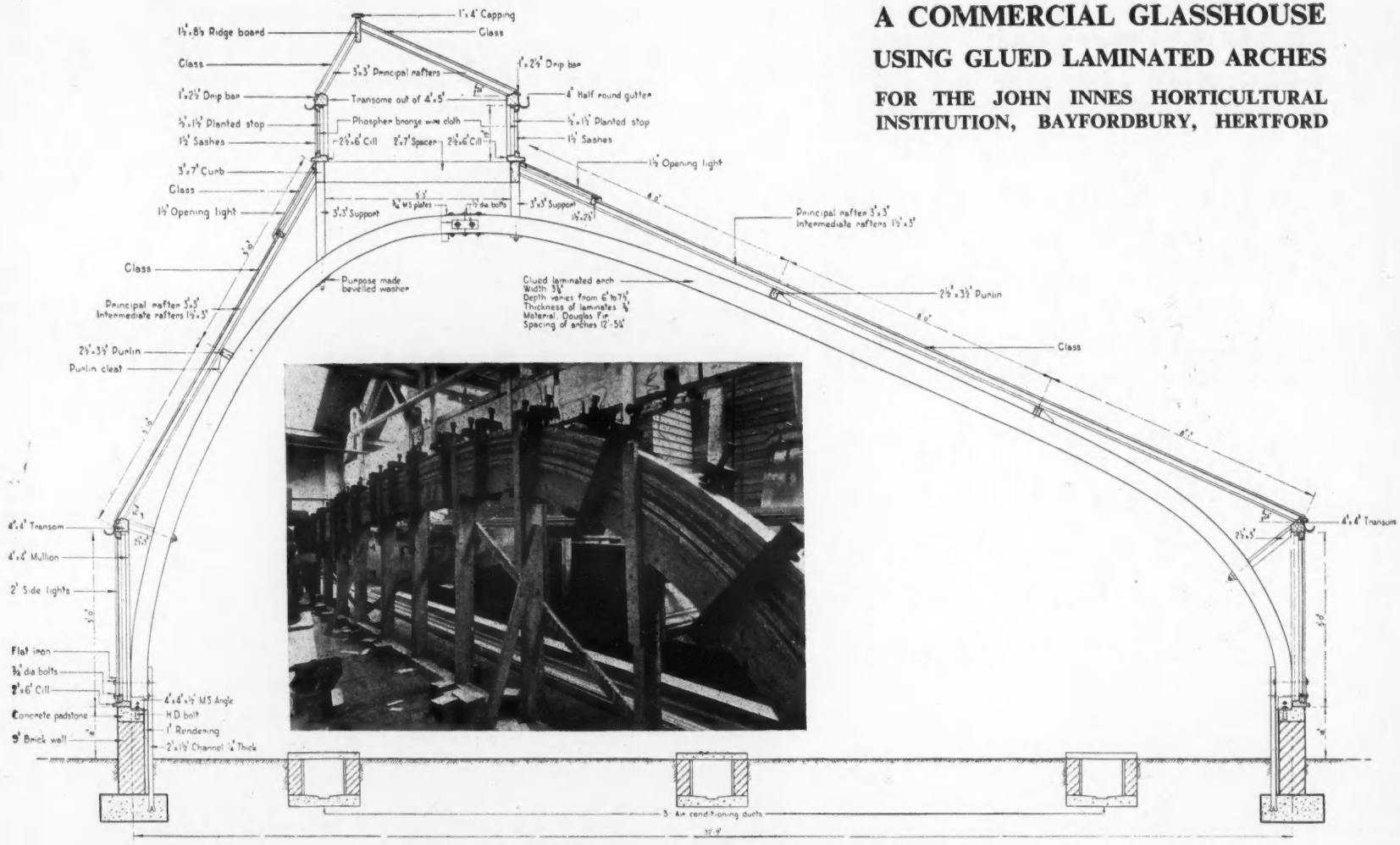
Cargo Fleet Iron Co., structural steelwork ; Concrete, Ltd., precast floor and roof beams ; Art Pavements and Decorations, Ltd., tile pavings, and terrazzo floor and wall finishes ; D. Burkle and Sons, doors and frames, ticket office counter and fittings, and ticket booths ; Light Steelwork, Ltd., collapsible gates, entrance canopy and bull's-eye signs, bronze handrails and barriers, and bronze platform sign frames ; C. E. Welstead, Ltd., metal casements ; British Challenge Glazing Co., Ltd., patent glazing ; General Asphalte Co.,asphalt floors and roofs ; Anderson Construction Co., false ceilings ; Associated Clay Industries, sanitary fittings ; Lockerbie and Wilkinson, Ltd., and Nettlefolds, ironmongery ; C. W. Evans, and Son, heating and ventilation, and h.w.s. ; Carter and Co. (London), Ltd., wall and floor tiling ; Shaws Glazed Brick Co., Ltd., faience wall slabs ; Fenning and Co., granite facing ; Vigers Bros., wood block flooring ; Dennison Kett, roller shutter ; G. C. Harris, aluminium T.O. front, litter baskets, letter boxes ; Wiggins Sankey, aluminium canteen serving screen and calence ; Scrutex, Ltd., "Scrutex" flooring; Luco Art Metal, aluminium light box ; Hickman, Ltd., ticket booth ; and Dent and Hellyer, drinking fountains.

View of platforms.

A COMMERCIAL GLASSHOUSE

USING GLUED LAMINATED ARCHES

FOR THE JOHN INNES HORTICULTURAL INSTITUTION, BAYFORDBURY, HERTFORD



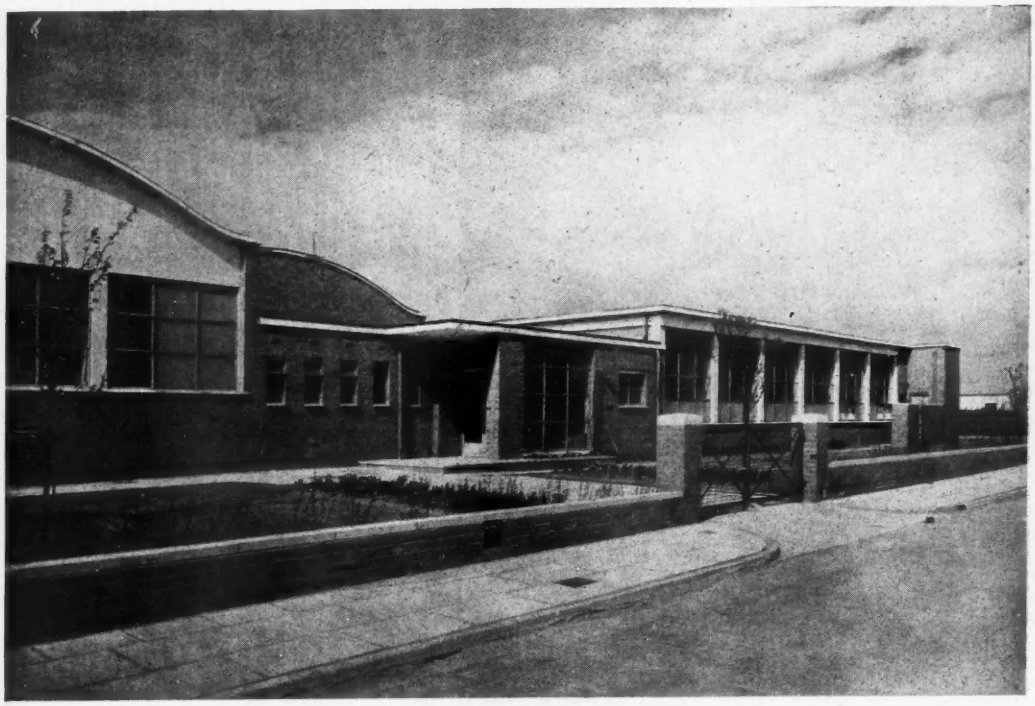
Section through an arch. *Inset* **: Assembly of half-arch on vertical jig.**

Detail view showing method of supporting lantern from the glued laminated arches. Each arch is made in two sections jointed at the crown with metal plates and supported by concrete padstones on 1 ft. 6 in. high brick dwarf walls. The arches are spaced at 12 ft. 5½ in. centres.

COMMERCIAL GLASSHOUSE USING GLUED LAMINATED ARCHES : Interior view during erection

THE Timber Development Association have recently extended the application of modern timber engineering to the design of commercial glasshouses. An opportunity arose when it was decided that the John Innes Horticultural Institution would need eight glasshouses on the site of their new premises at Bayfordbury, near Hertford. The Ministry of Agriculture and Fisheries decided that this would be a good opportunity to study the most recent developments in the construction of commercial glasshouses, and they appointed a consulting engineer, Mr. J. E. Temple, Whit.Sch., D.I.C., to supervise the scheme. Six of the houses are 32 ft. wide and 100 ft. long, and two of them are in timber construction, one on traditional lines to act as a control and the other an "advanced" timber glasshouse making use of the most up-to-date technique. It was for this design that the Ministry approached the T.D.A. The conditions were that the house should have uneven pitches of 60 deg. and 24 deg., and that the interior should be entirely unobstructed by supports. The Research and Design Department of the T.D.A. studied the problem and submitted a design making use of glued laminated timber arches spanning the full width of the house. Messrs. Duncan Tucker (Tottenham), Ltd., were appointed as contractors for the work, and the contract for the arches was placed with Jicwood, Ltd., of Weybridge, Surrey. A prototype section of the house was first erected at Messrs. Duncan Tucker's works and tested by the Forest Products Research Laboratory. The tests were entirely successful and the design was accepted by the Ministry.

The material is Douglas fir; the arches are 3⅜ in. wide and vary in depth from 6 in. to 7½ in. The taper is provided to cut down light obstruction to a minimum and to provide the greatest strength where it is most needed. Arches are built up of laminates ⅝ in. thick, scarfed end-to-end before assembly. The adhesive used is phenol-formaldehyde synthetic resin, impervious to the moist atmosphere and high temperatures likely to prevail in the glasshouse.



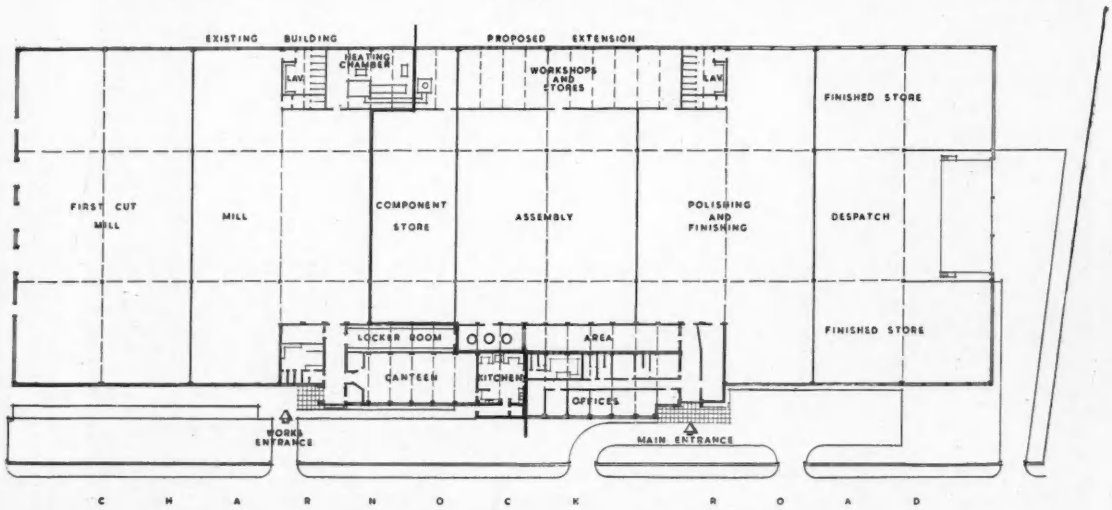
View showing main entrance. *Below :* Plan.

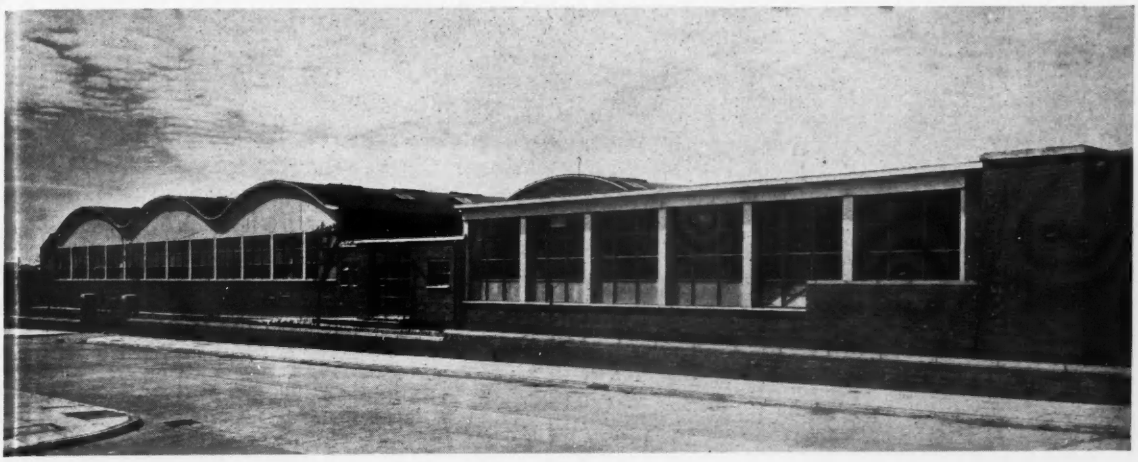
BARREL VAULT FACTORY, STOPGATE LANE, LIVERPOOL

WILLIAM L. LOWE AND BRIAN FERGUSON (Wm. L. LOWE & PARTNERS), ARCHITECTS

THE factory—for Ross and Co. (Liverpool), Ltd.—was designed as a whole, but only one-third has been erected. As a temporary arrangement the works entrance hall is used as the main entrance, and part of the canteen is partitioned to form offices. The complete scheme provides for straight-line production of high-class furniture, from the timber drying bays at one end of the site to the despatch department at the other as shown on plan. The works entrance is planned so that the cycle racks, time office, locker room and washing room are passed on entering and leaving. The kitchen, being centrally placed, can serve the canteen, also the directors' and staff dining rooms.

Construction.—The main factory is covered with a barrel vault roof of shell concrete, designed by Twisteel Reinforcement, Ltd. The vault is 2½ in. thick, reinforced with ⅜-in. diameter bars and two layers of "Wireweld" fabric, finished on the top with two layers of felt with ½-in. insulation board on the under side. The main columns are 15 in. square with a 4-in. rainwater pipe in the centre of each. The flat roofs are constructed with precast concrete units and steel beams.



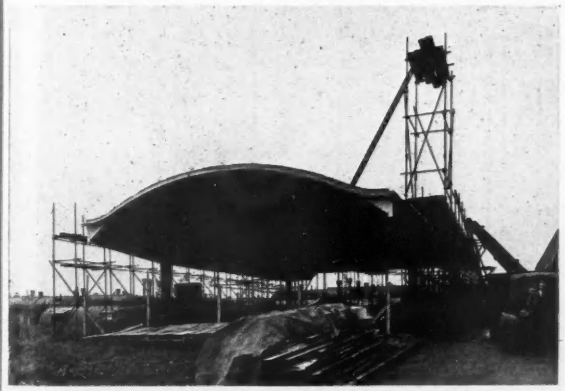


General view of factory.

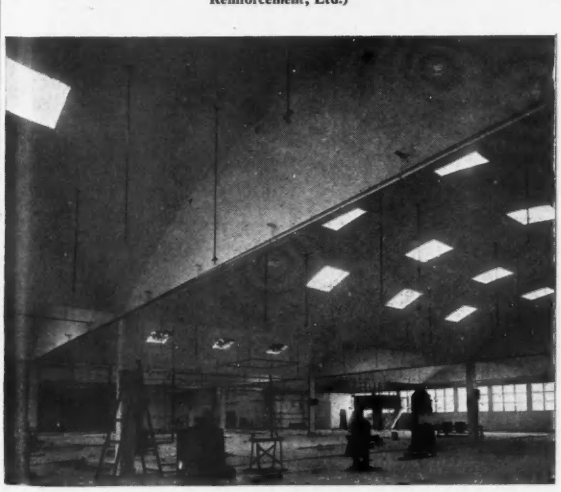
Heating is by warmed air, partially recirculated, and the air can also be circulated to cool the building in the summer.

Wood storage bay.—This building is entirely a separate structure, and was, therefore, an ideal subject on which to carry out the tests required by Mr. G. P. Clingan, the City Building Surveyor. The following report from the Building Research Station shows that the results were satisfactory:

As temperature movements were expected in this type of structure, a preliminary test was carried with the roof unloaded so that proportionate allowance for temperature changes could be made in the deflections under load.



View of wood storage bay with the loading test in progress. (Photo: Twisteel Reinforcement, Ltd.)



The interior.

The barrel vault roof has a radius of 35 ft., a chord width of 42 ft., and a length of 100 ft. The supporting columns are set in 20 ft. from the ends on the long edges of the barrel, giving a central span of 60 ft. with two overhanging cantilever spans of 20 ft. each. The columns are connected across the width of the barrel by stiffening beams, and edge beams are provided along the long edges of the barrel. The thickness of the shell is 2½ in. increasing to 3 in. near the stiffening beams. In accordance with present-day regulations, it is designed to carry a superimposed load of 15 lb. per sq. ft., and was therefore tested with a load 50 per cent. greater than this in accordance with Section 10, Paragraph 1,001, of the D.S.I.R. Code of Practice.

Method of testing.—Deflectometers capable of indicating deflection changes were connected by "invar" wires screwed into wooden blocks, the latter being fixed to the roof with quick-drying waterproof adhesive. The relative lateral movement (spread) of the two edge beams at mid-span was measured by fastening invar wire to one edge beam and connecting the other end to a spring-loaded deflectometer clamped in a horizontal position to the second edge beam. Arrangements were also made to measure the settlement of the columns, etc. Temperatures were eventually measured by means of thermometers placed close to the underside of the roof.

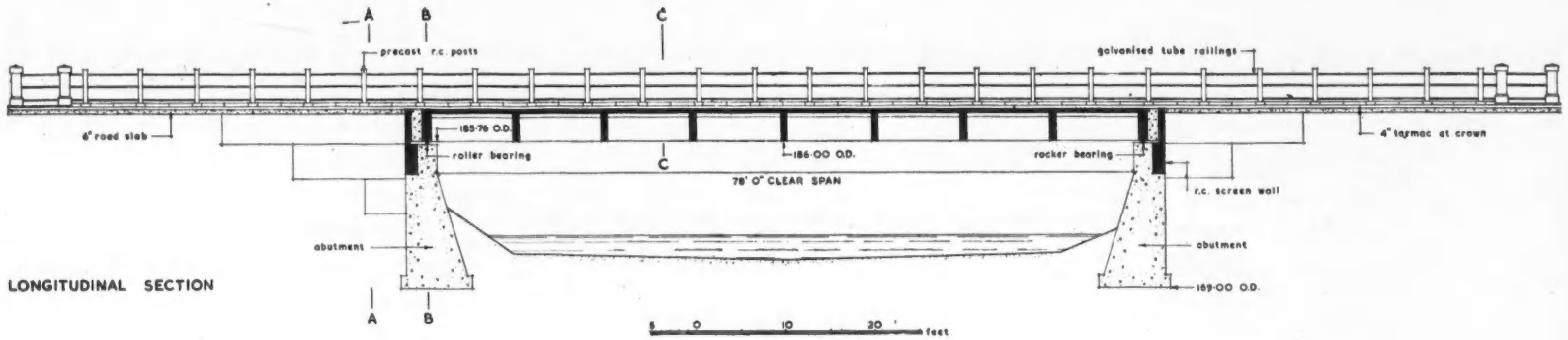
Temperature movements.—These were not consistent. Although the trend of the movements was in general the same, there was no definite position of the roof corresponding to identical temperature readings on different days. Roughly, the crown of the barrel rises or falls 1/100-in. for each degree Fahr. change of temperature.

Movement due to load.—All movements are very small; moreover, the movements due to temperature changes, particularly those which are at the moment unpredictable, are of the same order as the movement due to load and it is possible that the total movement due to temperature change from a hot day to that of a cold day might be greater than that due to the test load above. Column settlements are also a large proportion of the total deflection under load.

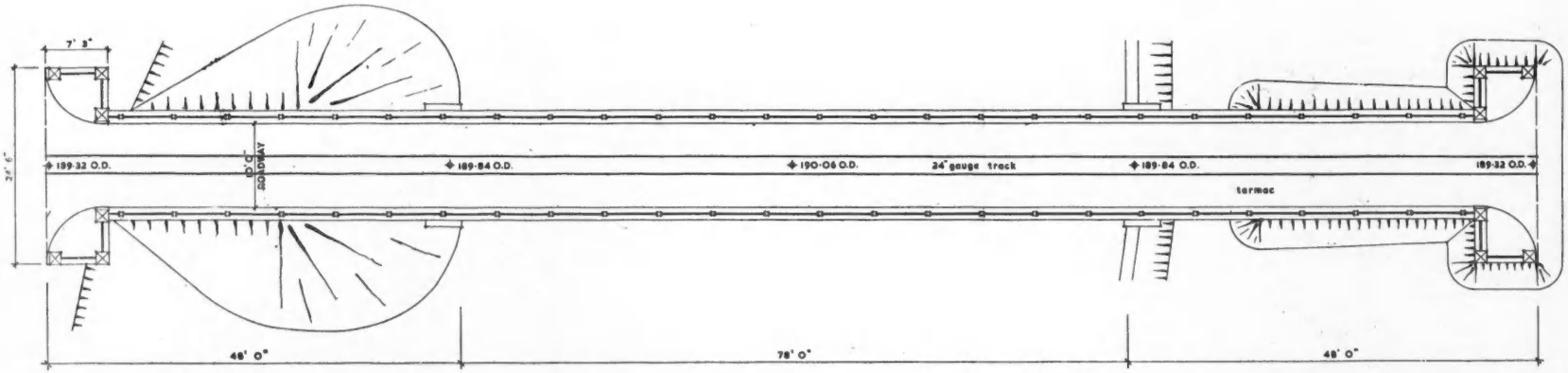
Conclusions.—The maximum deflection of the roof at mid-span under an applied load of 150 per cent. (*i.e.*, 22½ lb. per sq. ft.) of the design live load, was about 1/8-in. only. This is about 1/6000 of the span.

In view of this small deflection under load, which is of the same order as the deflection due to column settlement under load or to possible temperature changes, and in view of the absence of any signs of distress due to the loading, it is considered that the roof is capable of carrying with safety a live load of at least 15 lb. per sq. ft. on plan.

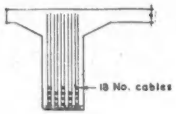
The general contractors were Messrs. William Moss and Sons, Ltd. Subcontractors and suppliers were: Steel scaffolding and sheeting, Mills Scaffold Co., Ltd.; precast concrete work, Ferroconcrete (Lancs), Ltd.; roof felting, Irwins Roof Coverings, Ltd.; metal windows, Williams and Watson, Ltd.; electrical installation, Parry's (Electrical Engineers), Ltd.; sanitary fittings, Associated Clay Industries; and steelwork, McIntyre and Sons, Ltd.



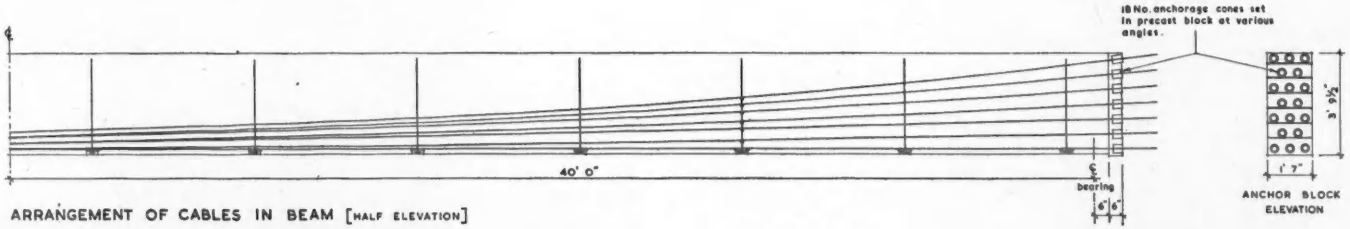
LONGITUDINAL SECTION



PLAN.



BEAM SECTION AT MID-SPAN



ARRANGEMENT OF CABLES IN BEAM [HALF ELEVATION]

ANCHOR BLOCK ELEVATION

PRESTRESSED CONCRETE BRIDGE OVER RIVER TAME, FOR DENTON U.D.C.

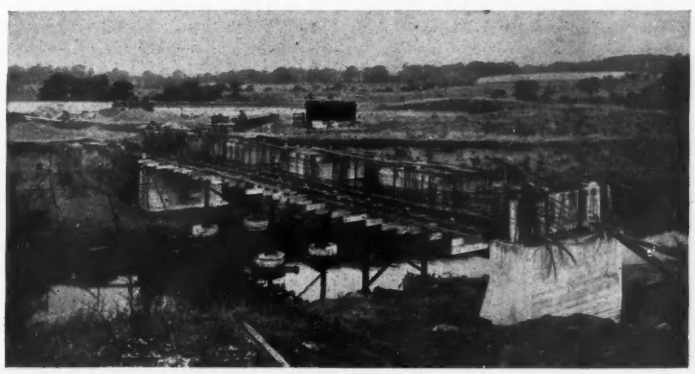
The completed bridge.

PRESTRESSED CONCRETE BRIDGE over the River Tame, for Denton U.D.C.

G. B. KERSHAW AND KAUFMAN AND L. G. MOUCHEL AND PARTNERS, LTD., JOINT CONSULTING ENGINEERS

THE bridge which spans the River Tame at Denton Sewage Treatment Works provides a 10-ft. wide carriageway for 10-ton lorries. It spans 80 ft. between supports. The underside had to be set rather high, to make certain of obtaining sufficient clearance from floating debris at times of flood. As a consequence, the available structural depth between the clearance line and the road level amounted to only 3 ft. 9 in., a design made feasible by the use of prestressed concrete.

The whole structure, cast *in situ* on a temporary staging, consists of two concrete beams, 18 in. wide and 3 ft. 9 in. deep, cast monolithically with a 6 in. thick road slab. Each beam contains 18 prestressing cables of the Freyssinet type, which induce in the concrete permanent precompressions greater than the tension caused by dead weight and traffic loads. A minimum cube strength of concrete of 6,000 lb. per sq. in. at 28 days was specified; in fact, seven-day cube tests showed an average strength well above this figure.

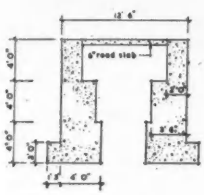


The bridge under construction, showing the cables being placed in position.

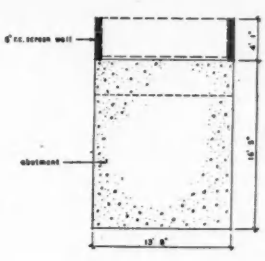
The beams were cast first, in 10-ft. sections with vertical working joints between each section. As these working joints would always be under compression, by virtue of prestressing, there was no danger of their impairing the strength of the structure. The vibrators were fixed to the formwork. The tensioning and fixing of the cables, which took place after maturing of the concrete, was operated by means of the Freyssinet double-acting jacks. The primary action of the jacks was used to tension the cables, and the secondary action fixed the same cables under permanent tension by driving a wedge which blocked the ends of the wires. The jacks were operated by Tangye pumps. The tensioning of the 36 cables to a total force of 900 tons took about 5 days, using one pair of jacks. The same work, however, could easily be carried out in a matter of two to three days, on a routine basis, and with an additional pair of jacks as stand-by. The quantities of steel in the main beams amount to 36 cwt. for the cables and 6 cwt. for the auxiliary mild steel reinforcement, the latter being solely provided to facilitate the fixing of the cables on a parabolic curve.

The contract price for the erection of the bridge, abutments, river wall and approaches amounts to approximately £8,000, of which £2,300 covers the erection of the prestressed beams and deck slab.

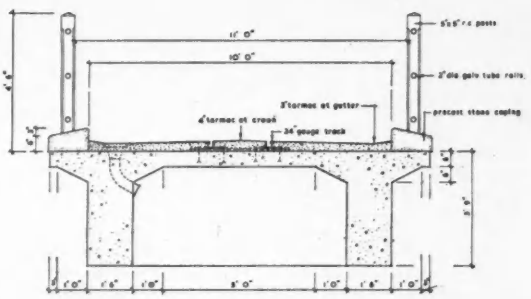
The joint consulting engineers were Messrs. G. B. Kershaw and Kaufman, and L. G. Mouchel and Partners, Ltd. Contractors were Messrs. R. and T. Howarth, Ltd. The engineers and surveyors to the Denton U.D.C. were Messrs. Duncan S. Graham, B.Sc., M.I.Mun.E., and John B. Cooke, M.I.Mun.E., F.R.San.I.



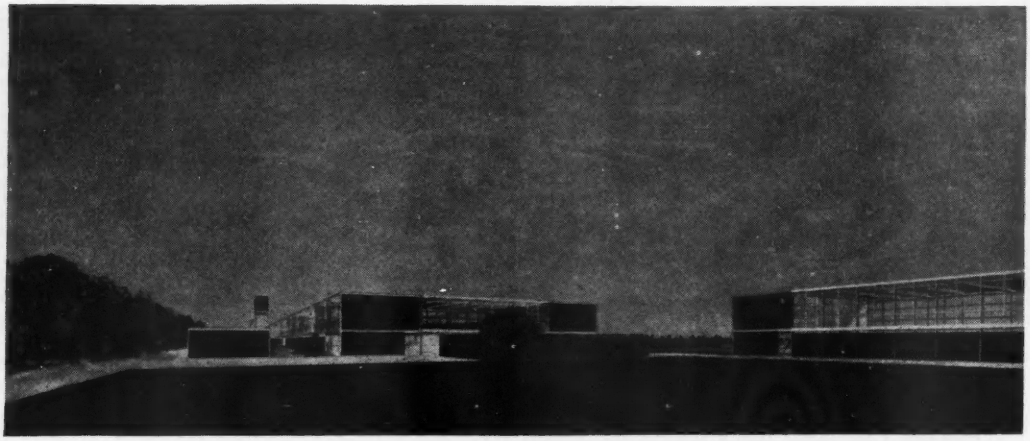
SECTION A-A



SECTION B-B



SECTION C-C



A perspective view of the winning design from the west.

COMPETITION: SECONDARY MODERN SCHOOL, HUNSTANTON

The Assessor's and Winners' Reports

THE AWARD of the assessor, Mr. Denis Clarke Hall, F.R.I.B.A., in the competition sponsored by the Norfolk Education Committee for a Secondary Modern School at Hunstanton was given in our issue for April 28. Herewith we reproduce the winning design.

Following are extracts from the assessor's report:—

Out of the 56 designs submitted, the three awards were the only ones that, in my opinion, gave any real contribution to the problems of planning schools to the 1950 requirements. While there were many interesting plans, the majority of the competitors failed to show an understanding of the functions of a school, or contemporary school architecture, or failed to appreciate that, since the war, there has been an almost annual change in the planning and construction of school buildings. This can be traced through from the first schools built under the New Regulations, the Operational Programmes, the concentration on Primary Schools, and the liberal interpretation of the Building Regulations for Secondary Modern Schools, and now the implications of Circular 209, making schools designed even last year unsuitable for the 1950 programme.

Many good sound examples of planning were, in my opinion, very poor examples of architecture, and many interesting designs showed a complete lack of understanding of the functions of a school, and, although the maximum floor area was clearly stated in the conditions, a number of competitors failed to plan within those limits. The open plan in nearly all its forms was predominant, making a striking contrast with the neat, compact layout of the three winning designs.

While, on first sight, the winning design might appear as a reactionary step back to the old courtyard planning, a detailed examination will show that the detailed handling of the plan requirements bears no resemblance, and I considered that this scheme was an outstanding contribution to school design.

One of the most interesting features of the winning plan is the placing of the entire teaching area on the first floor of the main building, leaving the ground floor clear for planning of the administration, cloakrooms, and lavatories, etc.

This scheme as a whole is straightforward and workable, and could be built well within the limitations. Its compact plan not only shows a saving in circulation area, but also in such items as services, drainage and foundations.

The use of internal courts are carefully considered and planned as quiet open spaces. Whether or not they are a definite contribution to the school amenities will, of course, depend entirely on their upkeep.

The positioning of the head teacher's living quarters will probably cause some criticism, as head teachers generally prefer living away from the school. This, however, can be very easily rectified by building a separate head teacher's house away from the main building. This does not necessarily apply to the caretaker's house, as the caretaker is responsible for the supervision of the school during the holidays, and after school hours.

In this scheme, use has been made of the dining spaces for alternative purposes. The dining areas are extremely flexible and can be thrown into the hall, or alternatively part-divided by movable screens making additional teaching area overlooking the east court.

The placing of the cloakrooms, as shown, makes it necessary for a large number of the pupils to go a long way through the school to get to these, or, alternatively, to pass the head teacher's or caretaker's living quarters. The cloakrooms also appear to be rather small and inadequate, but there is ample space in the circulation hall to the south which could be used, as this area appears to be rather extravagant. These points, however, could easily be amended if required.

While the plan is very economical, there are places where the heights shown are extravagant. The workshops seem unnecessarily high, and a further reduction in cube might be obtained by limiting the general all round height of the first floor, which is given as 11 ft. As the first-floor rooms are adequately lit from wall windows on both sides, or have good top lighting, the 11-ft. floor-to-ceiling height shown appears slightly excessive.

The principle of the movable stage projecting into the Assembly Hall might be criticised for secondary schools, but as the stage area is in addition to the total area of the Hall, there is ample room for replanning this, if required, within the main structure.

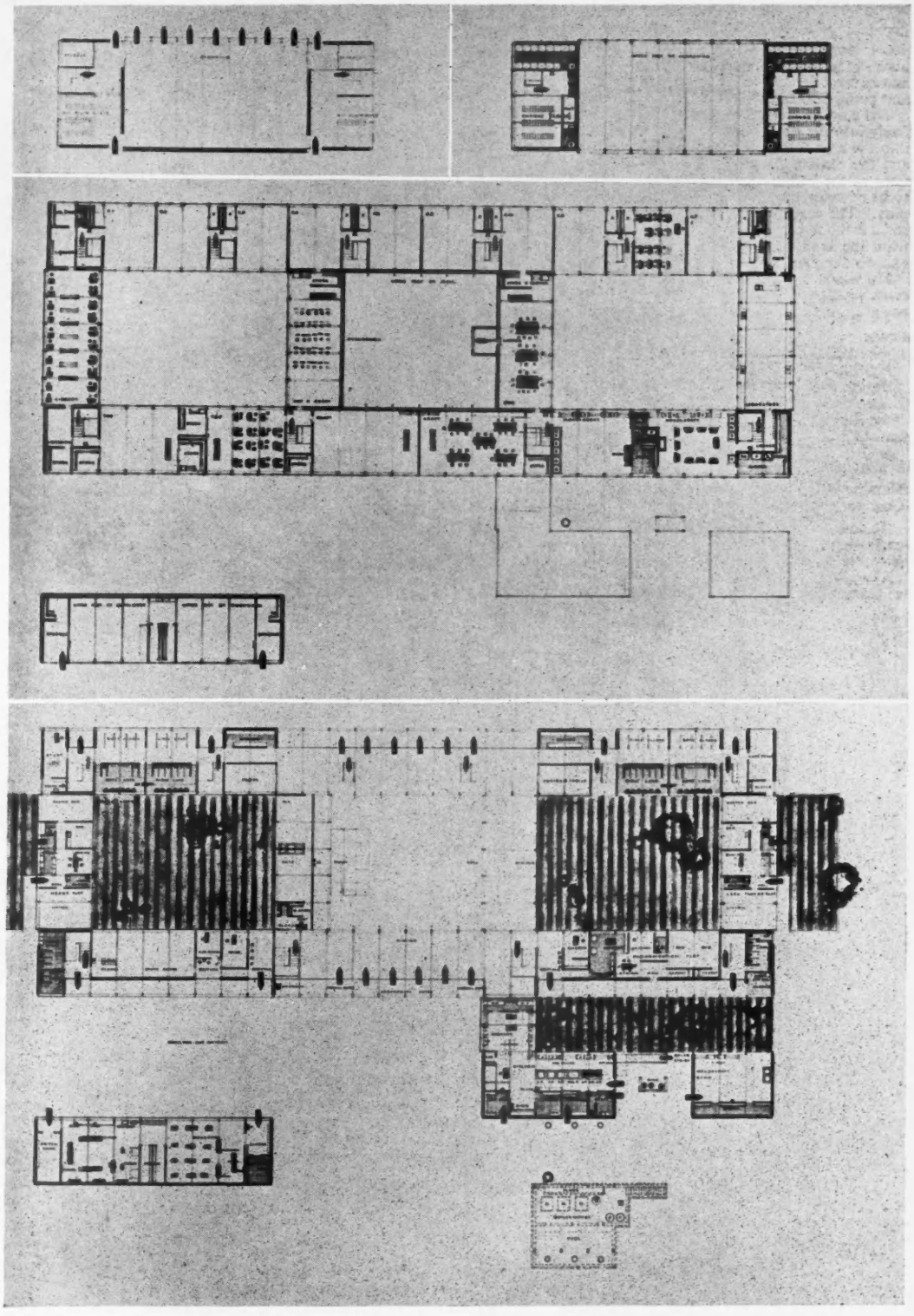
Minor modifications may be required, such as the layout of the kitchen and access to a housecraft store through the larder, but, taking the scheme as a whole, there is, in my opinion, nothing that would require any major revisions, and would produce a first-class, workable school.

The structure is a simple r.s.j. frame forming 10-ft. structural bays, and with floors and roofs of precast concrete units, which should present no difficulties at working drawing stage, and the repeated use of standard sections in the major part of the building should assist in the preparation of these drawings, and also the quantities.

The elevations are very carefully and clearly worked out, and should produce a very pleasing building. The drawings are very beautifully prepared and presented, but unfortunately the report is extremely scrappy. It was obviously done in a very great hurry, very late at night, and many of the figures given are incorrect, but a very careful check from the actual drawings has shown that the scheme comes within the areas prescribed in the Conditions, and the total cost, which is given as £131,000, should be possible, provided, of course, economy is considered in the fittings and finishes.

The second award, No. 35 (John B. Diamond, A.R.I.B.A.), was again an extremely interesting and economical plan. However, the placing of the Assembly Hall and dining rooms on the first floor, I feel, would not be acceptable, owing to the peak periods of circulation being concentrated on the main staircase.

The third award, No. 56 (G. Whitby, M.B.E., A.R.I.B.A.) is again economical in circulation, which is achieved by the use of blocks planned in the form of a cross, with a central lobby and staircase. The report was extremely clear.



Ground-floor and first-floor plans. At the top are the gymnasium plans.

COMPETITION FOR A SECONDARY MODERN SCHOOL, HUNSTANTON

WINNING DESIGN : ALISON M. SMITHSON, A.R.I.B.A., DIP. ARCH. (Dist.), AND PETER D. SMITHSON, A.R.I.B.A., DIP. ARCH. (Dist.), ARCHITECTS

The Winners' Report

Following are extracts from the report of the winners :—

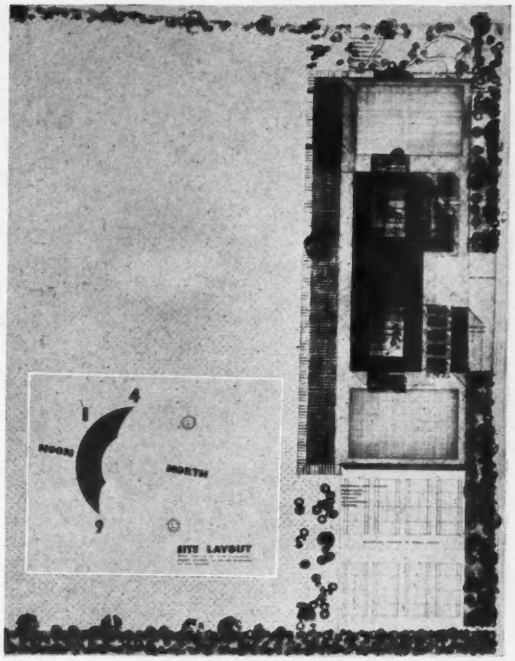
Our project is an attempt to carry the design of school beyond the diagrammatic stage into a work of architecture, and its form is dictated by a close study of educational needs and purely formal requirements rather than by precedent.

The core of the school is the Assembly Hall, which flows freely into the dining areas and entrance areas, so carrying into the school the planes of the forecourt, the green court and the playing fields. This grouping allows the circulations of the hall, the dining areas and the school generally to be superimposed, resulting in a compact and economical plan. The east wall of the Assembly Hall forms the cyclorama to the stage, and the projection room is partly suspended from the monitor beams high up on the west wall, with exit on the roof of the "900" classroom.

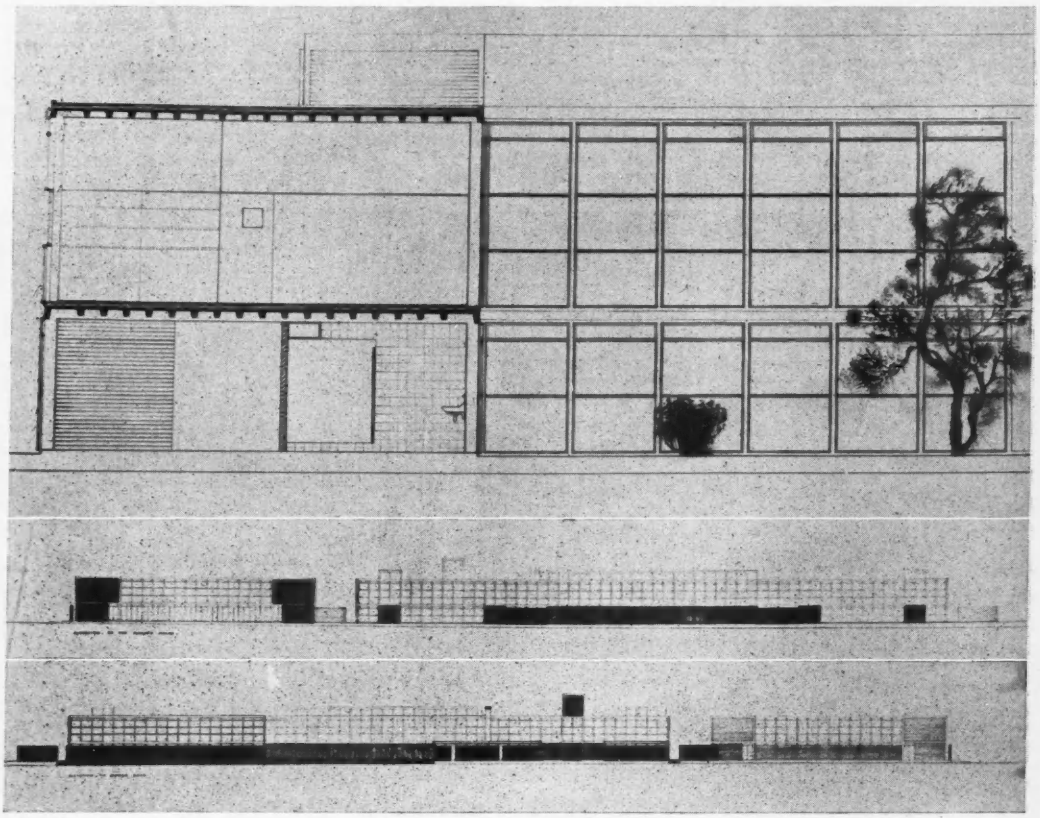
No windows open out on to the green courts except for cross ventilation, and no movement is allowed there. They are green light areas, quite free from noise.

Costs	£
Main buildings 680,000 cubic feet, including lighting and heating engineering services at 3s. 6d. per foot cube	119,000
Drains provision	3,500
Bounding walls, etc.	1,000
Layout and planting	7,500
Total	£131,000
Number of pupils (as for floor area)	510
Cost per place	£258

Floor Area.—The total floor inside the external walls exclusive of Dem. Flat, housecraft room and bicycle sheds is 45,748 sq. ft. As the number of pupils is 510, that gives 89.7 sq. ft. per pupil. Teaching areas occupy 61.25 per cent. of the total floor area and 71 per cent. of the total cube.



The layout.



Elevations and half-inch detail.

COMPETITION FOR A SECONDARY MODERN SCHOOL, HUNSTANTON

WINNING DESIGN : ALISON M. SMITHSON, A.R.I.B.A., DIP. ARCH. (Dist.), AND PETER D. SMITHSON, A.R.I.B.A., DIP. ARCH. (Dist.), ARCHITECTS

THE DEVELOPMENT OF BUILDING PLANT

Field Test Unit's Work to Reduce Costs

By K. G. H. FRYER, O.B.E., M.I.Mech.E.

THE purpose of this article is to give an account of activities at the Field Test Unit* which are mainly concerned with the testing and development of building plant, and to invite the support and co-operation of the industry.

The cost of house-building to-day is above the figure which can be economically recovered by a reasonable rent; consequently house-building has to be subsidised. A possible solution to this problem is increased productivity per man and reduction in cost. Extra physical effort, although it will help, is not enough. In my opinion, mechanisation is the answer.

Let us consider the materials which have to be handled in a pair of houses of about 900 sq. ft. super. If you add together all the weights of material to be handled the aggregate is 378 tons, quite a large figure in itself. However, much of this stuff has to be moved more than once, consequently the total weight handled is more like 1,200 tons.

In the majority of cases, therefore, some 1,200 tons of various materials are lifted and moved manually when building a pair of semi-detached houses. Surely here is a case for mechanisation, whereby a saving in cost can be achieved, but the problem is not simple.

The introduction of machines, building jigs, and similar innovations upsets traditional methods, and new ones must be evolved. Furthermore, to effect a saving machines must be kept at work; the longer they are idle the less the return for the money invested in them. Reorganisation of work on the site then becomes essential.

Early Investigations.

Let us consider how a need for the mechanisation of a process is arrived at by the Field Test Unit.

The investigations undertaken by the Ministry begin long before any plant is built or tested. A thorough investigation is made of labour expenditure and cost of building by existing methods. The Ministry has made a unique collection of data on labour expenditures on building obtained by detailed observation on a large number of housing sites, and from these it is possible to isolate those operations which are high in labour cost, and where mechanisation would appear to be warranted.

These operations are then subjected to more detailed investigation in order to find out by time and motion study the labour expenditure and cost involved. Both productive and non-productive times are analysed; different methods used are compared and evaluated and the reasons for apparent lack of efficiency are investigated.

It might be argued that all this forms part of the market research programmes of the plant manufacturers. However, mechanisation of smaller building work is not straightforward, and detailed investigation on a large number of sites is required in order to establish, first, the nature and amount of work envisaged for any particular machine, and second, the efficiency of manual operations and to what extent they can be altered to suit a machine. This work does not offer a very clear prospect of profit to the plant manufacturers and this is one reason why so little plant is available to the builder as compared with the civil engineering contractor.

Having sifted the data obtained as a result of this operational research, we reach the stage where we can consider the possibilities of mechanising an operation. It is possible to draw up a specification of the mechanical requirements, with some knowledge of the work available for the machine to do, and also the maximum capital, running and maintenance costs that it can carry.

A thorough search is then made for plant already on the market or in process of development, which might fulfil the specification, or which appears to be suitable for modification to meet the requirements. If any such plant is found, attempts are made to acquire and test it. If no suitable plant can be found, and no firm discovered willing to embark on development privately, the Field Test Unit may undertake to build a prototype machine to test out the principle, after the project has been approved by an industrial advisory committee. The prototype machine or "mock up" may be produced at the Field Test Station or else by a development contract with an outside firm.

Essential Characteristics.

As our object is to prove by practical means that a process can be economically mechanised, and not to compete in any way with the plant manufacturer, any work put into the prototype is reduced to the minimum, and much of the design work is carried out in stages. In considering design we always bear in mind that plant is required for the builder engaged mainly on small or smallish projects and that if it is to be of any use to him it must have the following characteristics: (i) Mobility, so that it can be moved quickly from job to job and kept fully employed; (ii) low capital cost, to ensure that idle time is not too expensive; and (iii) machines which can be used for a number of purposes, i.e., multi-purpose tools.

It is often difficult to design a machine to execute the small jobs which have to be done, and we think this idea of multi-purpose tools is promising. It is an idea which has been put to practical use in agriculture and market gardening, where the tractor is the basis machine, and a number of implements driven by the tractor are supplied to do a variety of work.

We now come to the point of actually producing a machine to comply with the design specification that has been drawn up. The clearest way of describing this is to give some illustrations of an actual case.

The problem was to produce a machine for the excavation of footings and drainage trenches, etc., which would be an economical piece of plant for use by the small builder. The data available from site observation and time and motion studies showed us that the rate of manual operation varied between .3 and .5 cu. yd. per man hour according to the nature of the soil.

We can say, therefore, that manual excavation costs between 4s. 10d. and 7s. 3d. per cu. yd.

Now we assume the life of a mechanical excavator will be seven years, and that 100 per cent. of the cost will have to be expended in maintenance over that period. We estimate it will only be in use 1,000 hours per year. When in use it will require an operator and a labourer in attendance, and it will require fuel and oil. We then proceed to consider the lightest and most economically-powered machine suitable for the purpose, coupled with a potential rate of doing the work that will ensure a substantial increase compared with manual methods. Without going into all the details, our calculations give these answers: a machine of this description would cost about £900 and should have an average output of 6 cu. yds. per hour. It should not weigh more than approximately 30 cwt. and an 8-h.p. engine should be adequate.

On this basis the plant and labour cost works out at 2s. 4d. per cu. yd. of soil excavated, giving a minimum potential saving of 2s. 6d. per cu. yd. and a maximum of 4s. 11d. per cu. yd. Taking into account manoeuvring time between blocks and transport to site, off-loading, etc., the increase in rate of doing the work might be in the region of 200 per cent. on an average.

The question of utilising the machine for other purposes than excavation was considered, and the machine selected for modification is the small mobile crane shown in Fig. 1 in its original form.

Powered by an 8-h.p. engine it can be used as a crane, as an excavator and as a loading or facing shovel. It can be carried in a 3-ton lorry or on a light trailer, and therefore transporting it from site to site does not present the same high transport cost and difficulties as compared with the larger trenchers and excavators. The fuel consumption works out at about a quart of petrol per hour. The machine in its final form will be mounted on caterpillar tracks.

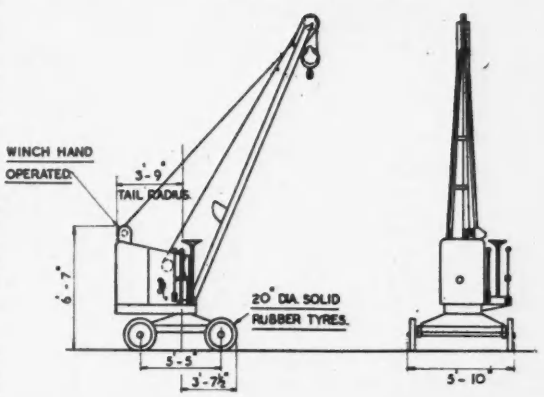


Fig. 1.

* As from April 1, 1950, the Chief Scientific Adviser's Division, including the Field Test Unit, was transferred to the Department of Scientific and Industrial Research.

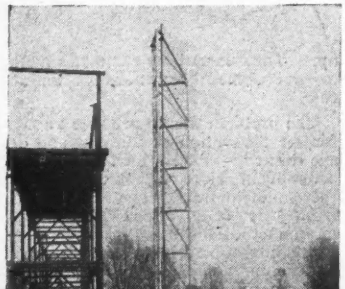


Fig. 2.

The machine is subjected to field tests at the F.T.U., under conditions simulating as closely as possible those typical of a building site and a brief is prepared for the engineer responsible for the test, setting forth the full test requirements. As it is practically impossible to produce a defect-free machine straight from the drawing board, various defects usually come to light as a result of these rigorous tests. After modifications and further field tests, site trials, in the nature of controlled experiments, on actual building sites are arranged; time studies are made of all operations and, where possible, comparisons are made with machine and manual methods on the same site. Here, I should like to mention the co-operation and assistance very willingly given by a number of building firms in carrying out these trials.

On the completion, a comprehensive technical report on the machine is compiled which fully describes the following: object of development, description of the machine, stages of development, field trials and modifications incorporated as a result, also a full account of the site trials together with the time studies made. From these figures an assessment is made of the potential saving which could be obtained by using the particular machine. A suggested specification for manufacturers is attached, based on the data obtained.

Plant manufacturers are kept informed of the developments in hand through the Chief Plant Adviser of the Ministry, who negotiates with plant manufacturers interested in the further development and production of mechanical appliances and equipment for the building industry.

Some F.T.U. Achievements.

I am now going to describe various items of plant which have been developed. Some are now in production, and these can show a considerable saving in labour costs, if properly used, as evidenced by time study on actual sites.

Fig. 2 shows another attachment which has been made up and tried. It is a light hoist to lift three cwt. to a height of 15 ft. The mast is made of aluminium alloy. The winch forms part of the hoist unit and the whole can be offered up, attached, and the drive from the power off-take connected by two men in two or three minutes. Development of this attachment is at present in abeyance, as in order to comply with the new building regulations considerable modification is necessary.

The tractor can be supplied with a light two-wheel trailer, see Fig. 3, on to which the tractor can load itself, or which can be towed behind the tractor for general site transport duties. A 10/7 or 7/5 concrete mixer can also be moved to a new position by the tractor.

A firm has now gone into production with a machine based on the M.o.W. prototype and although the selling price at present is higher than our estimate of £320, the net potential saving in concreting is not appreciably affected and can still be about 4s. per cu. yard if the machine is used correctly. The maximum distance the machine may travel from the mixer to the job to attain the results given is 60 yards.

The production model (Fig. 4) of the three-wheel powered barrow incorporating M.o.W. patents has a seven cu. ft. capacity skip, is driven by a 3-h.p. petrol engine and steered by the single driving wheel. The whole engine and transmission unit can be turned through 360 deg., thus eliminating a reverse gear.

Although this motorised power barrow does not give as good a performance over bad ground as the tractor, it can be used to carry the full discharge of a 10/7 mixer over hard level ground. On soft, uneven ground, if steel mesh such as B.R.C. fabric is laid down, it will carry the full discharge of a 10/7 mixer.

Method studies indicate that with a 10/7 mixer and a team of seven men, concreting oversite, an average saving of 5s. per cu. yd. can be obtained, as compared with the traditional wheelbarrowing method under similar conditions; but to obtain these results some forethought and organisation are necessary.

The operating costs are calculated on the same basis as previously described. The capital cost of this machine is £120.

Still dealing with the transport of concrete we have also developed an overhead runway boom for a trolley carrying a skip of seven cu. ft. capacity. The boom is pivoted at the mixer end and runs on

Fig. 4

wheels at the opposite end, so that the skip can be discharged at any point within the house plan; the boom is about 40 ft. long and can be broken down into convenient lengths for ease of transport. Lifting tackle is provided for raising the skip over obstacles and to lower it for filling and discharging. The skip is emptied by either overturning or through a bottom discharge door.

Method studies have shown that a gang of six men is enough to erect, dismantle and move the boom. This gang, with a 10/7 mixer, including the extra time for erecting and dismantling the boom, can effect a saving of 4s. per cu. yd. for placing concrete in footings, and on oversite, compared with traditional methods. One advantage of this piece of equipment is that there is no engine to be operated or give trouble.

The hourly operating cost of this piece of equipment, based on capital cost of £175, interest on capital at 4 per cent., maintenance charges of £15 per annum, and 600 hours' use per year, works out at 1s. 11d.

Fig. 3.

Earth Auger.

In clay soil, when moisture movement up to depths of three to four feet causes differential settlement in foundations, footings must be taken to this depth.

As an alternative to excavating deep strip foundations, the Building Research Station have been examining the possibility of using short piles, formed by boring holes to a depth of about eight feet and 12 in. to 14 in. diameter, and pouring in the concrete in situ. Boring by hand is a tedious and lengthy process under most conditions. A prototype mechanical earth auger is based on an American machine. It is self-propelled for manœuvring on the site, but can also be towed behind a lorry for rapid transit from site to site. The actual time required to bore a hole 14 in. diameter in clay is about one minute per foot, but positioning and levelling take additional time, and therefore the time taken to position, level and bore a hole eight feet deep by 14 in. diameter varies between about 14 minutes and 30 minutes, depending upon the nature and condition of the site. Pile foundations for a pair of houses requiring 28 holes can be completed in a day. It is not yet possible to give a true comparison with hand excavation for deep strip foundations, as the most economical depth, spacing and diameter of piles has yet to be determined. Fig. 5 shows close-up of the auger head. To hand bore with two men and a manual auger a similar hole in clay may take from 28.8 to 68 minutes, but can take very much longer if roots and other obstructions which do not affect the machine are encountered.

Another development is a barrow to carry 40-48 bricks by clamping the bottom row. This type of barrow eliminates special containers or stillages. The bricks have to be formed into piles or in long rows of the requisite width.

The operator picks up a load, wheels the barrow to a platform hoist, and receives an empty barrow. The operator at the top of the hoist takes the full barrow from the hoist, wheels it along the scaffold platform, and deposits the stack of bricks where required. Working with a team of three men, two clamp barrows and a platform hoist, 1,670 bricks per hour were handled from the main stack to scaffold. With costs on the same basis as before described, bricks were handled at 5s. 11d. per 1,000 as compared with three hod carriers under similar site conditions handling 900 bricks per hour at a cost of 8s. per 1,000, showing a saving of 2s. 1d. per 1,000. Three men with wheelbarrows and a platform hoist can handle from stack to platform 1,350 bricks per hour at 7s. 3d. per 1,000, and therefore the saving over this method is 9d.

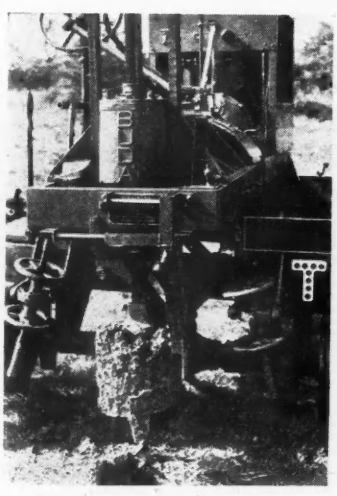


Fig. 5.

Following on from the clamp barrow, an alternative in the form of the hinged flap barrow has been produced. Its main features are that it is narrower and can be used in more restricted situations, and has been designed for hoisting by crane or winch when a platform hoist—essential for the clamp barrow—is not available. It holds 40 bricks, and the body of the barrow is a three sides box without top or bottom. A lever actuates two angle-iron flaps that are hinged to the bottom of the two sides. In front are two more flaps which need only be closed when hoisting by crane or winch.

The bricks are built into independent piles of 40 supported on two bricks placed end to end. The lever is thrown over opening the bottom flaps, the barrow is then pushed over the pile and the flaps closed, also the front flaps if necessary.

The rate of handling bricks by this means is approximately the same as with the clamp barrow with a corresponding saving in cost.

Temporary Cover.

Records of rainfall indicate an average loss of productive time due to wet weather on building sites of about 7 per cent., and allowing for other stoppages, resulting from rainfall, the figure is about 10 per cent. In Fig. 6 is seen a wire suspended type of temporary cover for small house construction; the main canvas sheets are attached to a ⅜-in. dia. ridge wire slung between two masts made of scaffold tube; they are raised into position from the ground by means of a small hand winch.

The cover can be raised as the work proceeds. When not required, the main sheets can be furled in the centre.

There is an alternative type in which the frame is 7-gauge aluminium alloy scaffold tube which is assembled at ground level and covered with canvas sheets and raised as required by means of jacks of light and cheap construction.

Both types have been tried out over several months, during which period the sheets have been subjected to winds up to 50 m.p.h. and to frequent alternate wetting and drying. However, development is not yet sufficiently advanced to allow me to give any accurate figures on capital, operating and maintenance costs, or saving in "rained off" time. Rough handling is inevitable under site conditions, and further investigation under such conditions is necessary to assess the possibilities. With the guaranteed week some form of cover may be required in the future.

In 1947 we were asked to find a substitute for timber scaffold boards, owing to the shortage of timber. The most likely material appeared to be corrugated 14-gauge steel sheet from Anderson shelters, which was being flattened and straightened. See Fig. 7.

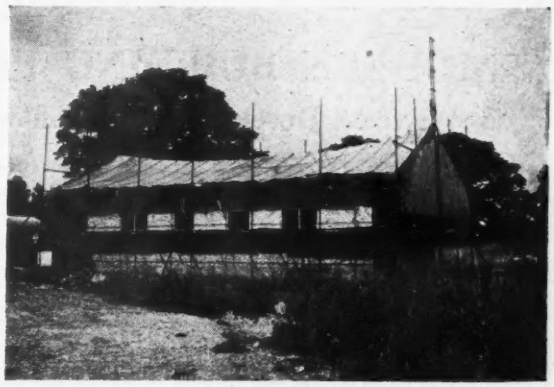


Fig. 6.

At the price then prevailing, 9-in. by 1½-in. by 7-in. steel planks could be produced at about 8d. to 9d. per foot, as compared with wooden boards at 11d. per foot.

However, the price of the material has risen and the planks now cost 1s. 3½d. per foot, which makes them less attractive. They are provided with a non-slip surface in the form of dimples or pimples; a plank 7 ft. long weighs approximately 25 lb. and is quite easily handled. The view shows them in position forming a scaffold platform. The only advantages we can claim for them are that they are as strong as a 1½-in. scaffold board; they cannot be sawn up for firewood, and should last twice as long as a wooden board. The galvanising is not appreciably affected by flattening, straightening and folding the steel.

No one would use them in preference to wooden boards, but they can and have been used without difficulty.

There are available, I believe, plentiful supplies of the material, which has limited uses and which cannot be melted down and remade into steel owing to the presence of spelter resulting from the galvanising process.

(Crown copyright reserved)

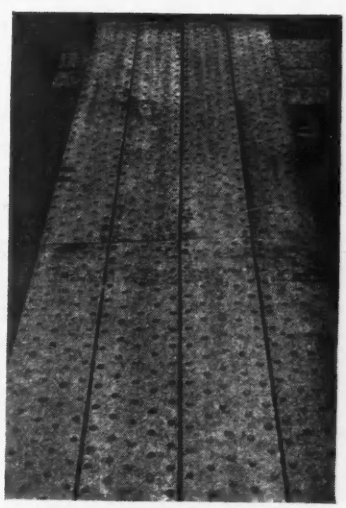


Fig. 7.

MODERN BUILDING PLANT AND MATERIALS

Recent Developments on Show at the British Industries Fair

MODERN ADVANCES in structural techniques, methods and finishes are reflected in the examples of British building plant and materials at this year's British Industries Fair, which opened at Castle Bromwich, Birmingham (Engineering and Hardware Section), and at Earls Court and Olympia on May 8.

A record number of buyers from overseas is confidently anticipated and building plant and component manufacturers have not spared themselves to ensure that those visiting the United Kingdon for the Fair will have the opportunity to see the finest display of products that British scientific engineering skill can devise.

The Fair is, of course, one of Britain's most important "shop-windows" and many exhibitors are taking the splendid opportunity the Fair provides to extend their business activities to foreign countries.

In the review given below of some of the principal stands carrying displays of plant and materials of interest to the building industry the firms bearing an asterisk ★ against their names are those who have informed us of their interest in the export market and their readiness to fulfil overseas orders.

CASTLE BROMWICH

Plant and Machinery

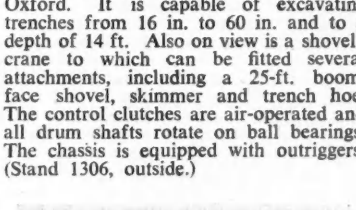
BUILDERS' hoists and power winches are presented by A. C. E. MACHINERY, LTD., Porden-road, Brixton, S.W.2. Particular prominence is given to the special purpose passenger/goods tower mast hoist and the new Mobilace. Three tower mast hoists may be seen in operation demonstrating duty as cage, concrete skip, and platform units. There is also a representative range of winches including those on portability sets. (Stands D, 235 inside and 1209 and 1108 outside.)

A range of spray painting equipment will be shown on the stand of AERASPRAY MFG. CO., LTD., 179-213, Thimble Mill-lane, Birmingham, 7, including spray guns, air rectifiers, pressure feed containers, turntables and other accessories. They will also be showing a range of both portable and stationery air compressor sets, from ½ h.p. to 10 h.p., with both petrol/paraffin engines and electric motors. (Stand D, 734.)

Several new lines of equipment will be introduced by AEROGRAPH CO., LTD., Lower Sydenham, London, S.E.26, on their stand, including a range of air-cooled air compressing plants of new design; two new spray guns and a lightweight ½-h.p. spraying outfit. There will be portable spray painting plants, pressure feed tanks, air transformers and spray guns for all purposes. (Stand D, 302.)

A comprehensive range of equipment is being shown by E. P. ALLAM AND CO., LTD., engineers, 45, Great Peter-street, London, S.W.1, and includes a high-frequency flexible drive internal vibrator, designed for rapid consolidation of concrete, as used in mass and reinforced concrete structures and large precast concrete products, etc. (Stands 1207 and 1106, outside.)

The Allen 16-60 trench excavator may be seen on the stand of ★JOHN ALLEN AND SONS (OXFORD), LTD., Cowley, Oxford. It is capable of excavating trenches from 16 in. to 60 in. and to a depth of 14 ft. Also on view is a shovel/crane to which can be fitted several attachments, including a 25-ft. boom, face shovel, skimmer and trench hoe. The control clutches are air-operated and all drum shafts rotate on ball bearings. The chassis is equipped with outriggers. (Stand 1306, outside.)



Air compressor and spray gun. (Aerograph Co., Ltd. Stand D, 302.)

On the ASSOCIATED BRITISH OIL ENGINES, LTD., Duke's-court, 32 Duke-street, S.W.1, stands, the main features will be four new engines: "Meadows" 970, "Petter-Fielding" DH, "Mirrlees" J6, and "Petter" AVA. The "Meadows" and "Petter-Fielding" will be on exhibition for the first time. The 970 is a six-cylinder supercharged diesel with a traction rating of 250 b.h.p. at 1,650 r.p.m. It has been introduced to meet the need for a high-speed diesel unit of medium weight and bulk (it weighs approximately 3,500 lb.) in the 180-250 b.h.p. range. (Stands D, 637, D, 534 and 1346, outside.)

Briefly the exhibits to be shown by AVELING-BARFORD, LTD., Grantham, consist of a complete range of rollers in weights varying from 1½ to 16 tons; dumpers from ½ cubic yard capacity up to a large six-wheeled heavy-duty diesel shuttle dumper with a capacity of 30,000 lb.; trench-cutting machine; calf-dozer; and a vibratory concrete finisher. (Stand 1338, outside.)

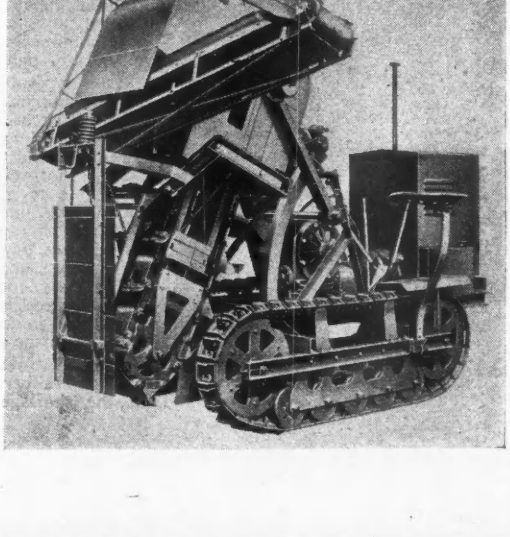
★BARBER-GREENE OLDING AND CO., LTD., of Hatfield, Herts, will be exhibiting a full range of machines. In addition to the three original equipments—finisher, ditcher and bucket loader—two entirely new machines will be exhibited for the first time. These are the "Junior" finisher and "Junior" ditcher, which have been specially developed to meet the requirements of the British and European markets. (Stand 1348, outside.)

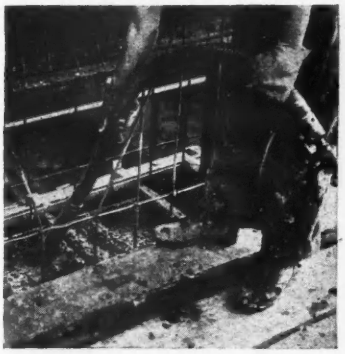
The exhibit of B. E. N. PATENTS, LTD., High Wycombe, Bucks, will comprise a comprehensive range of air compressors and spray painting equipment, including a range of stationary and portable compressors and portable spray painting units. Also on the stand will be a range of pneumatic tools including blow guns, paraffin oil guns, automatic tyre inflators and snarking plug cleaners and compressed air fittings. (Stand D, 431.)

A wide range of equipment will be shown by BLAW KNOX, LTD., Clifton House, Euston-road, N.W.1, including: the "Goliath" motor scraper, BK-12 motor grader, earth-moving equipment comprising towed scraper, angledozer, ripper, sheepsfoot tamping roller, etc.; land-clearing equipment comprising tree-dozer, stumper, front-mounted rake, root-cutter and towed root rake; "Rex" concrete mixers in sizes of 3½T, 5E, 7S, 10S, and 14S. (Stands 1303 and 1202, outside.)

Right: "Junior" lightweight ditcher. (Barber-Greene Olding and Co., Ltd. Stand 1348, outside.)

Below: Heavy duty diesel dumper. (Aveling-Barford, Ltd. Stand 1338, outside.)





"Broomwade" type NV 25 rotary immersion vibrator. (Broom and Wade, Ltd. Stands 1201 and 1100, outside.)

A new model 114B dumper and a loader of increased versatility, together with the models 10B diesel and 10B petrol dumpers of 3 cu. yd. capacity, and the 20B dumper of 6½ cu. yd. capacity, are to be shown by the manufacturers of Muir-Hill equipment, E. BOYDELL AND CO., LTD., Old Trafford, Manchester, 16. (Stands 1301 and 1200, outside.)

A feature of the exhibit of THE BRITISH STEEL PILING CO., LTD., 10, Haymarket, S.W.1, is an 80-ft. raking and rotating pile frame with sliding and adjustable leaders, complete with single-acting semi-automatic steam hammer, steam winch and oil-fired boiler. A light type pile frame, 35 ft. high of the self-erecting type, is also shown with a B.S.P. diesel pile hammer. (Stands 1103 and 1002, outside.)

THE BRITISH VACUUM CLEANER AND ENGINEERING CO., LTD., Leatherhead, Surrey, are exhibiting their sack-cleaning plant and a wide range of industrial portable vacuum cleaners. The company also manufacture a fixed plant, to be installed in the basement or other convenient space with pipes leading to terminal points on the various floors or departments of the building. (Stands D, 203 and 102.)

★BROOM AND WADE, LTD., High Wycombe, Bucks, will be exhibiting a full range of their air-compressors and pneumatic tools. (Stands 1201 and 1100, outside.)

A new spray gun, model 600, will be shown by ★ALFRED BULLOWS AND SONS, LTD., Long-street, Walsall, Staffs. This new gun meets the demand for a top-feed spray-gun retaining all the other characteristics of the Bullows model 2 gun. It is light in weight and is suitable for all types of work, including the application of vitreous enamel. The firm's range of multi-cylinder and single-cylinder air-cooled air-compressors will also be shown and these plants will be working exhibits. (Stand D, 646.)

★CHASESIDE ENGINEERING CO., LTD., Station Works, Hertford, Herts, will be exhibiting various machines, including a ¾-cu. yd. "Hi-Lift"-type mobile mechanical shovel (a new angledozer attachment will also be shown in conjunction with this machine); a 3-cu. yd. dumper with a Perkins diesel engine; a 2-ton mobile crane of fixed jib type, but incorporating three distinct lifting positions; and a shunting tractor. Other machines and attachments from the Chaseside range will be shown by means of photographic enlargements. (Stands 1204 and 1305, outside.)

The new Metalclad vertical spindle moulder will be among the exhibits of ★ GEORGE COHEN SONS AND CO., LTD., Sunbeam-road, N.W.10 (home), and Wood-lane, W.12 (export). The method of mounting the cutter spindle eliminates vibration.

The loose top-piece fits into the main spindle, and is held by a locknut in the usual manner, but the main spindle slides in a housing attached to the underside of the table. The motor drive is in a fixed position, and the entire raising and lowering motions are taken on the spindle alone. (Stands 1334, 1327 and 1226, outside.)

An indication of the extent to which the CONSOLIDATED PNEUMATIC TOOL CO., LTD., 232, Dawes-road, Fulham, S.W.6, have met the growing demands for plant in the civil engineering and contracting fields is given in the display of their portable compressors and other equipment. The firm's full range of air compressors comprises six models, the smallest being the 2-wheeler, one-tool machine of 63 cu. ft. capacity, with intermediary sizes of 105, 160, 210 and 315 cu. ft. capacities, up to the largest model with a capacity of 500 cu. ft. (Stand 1310, outside.)

CRANE, LTD., 45, Leman-street, London, E.1, will display a comprehensive range of cast-steel, gun-metal and cast-iron valves, companion fittings of malleable iron, etc. In addition, examples of their heating and domestic boilers, covering a range of capacities up to 1½ million B.T.U.s per hour, also the latest type of 2- and 4-column "Pall Mall" radiators, as well as wall and hospital radiators, may be seen. (Stand D, 611.)

A comprehensive range of "Felco" lifting appliances will be exhibited by FELCO HOISTS, LTD., 17, Victoria-Street, S.W.1, and will comprise chain pulley blocks (standard and roller bearing types); electric travelling chain blocks; equalising and adjuster slings, specially designed for lifting unbalanced loads; pulling jacks and wire rope electric pulley blocks. (Stand D, 128.)

The exhibits on the stand of ★GOODWIN BARSBY AND CO., LTD., St. Margarets Ironworks, Leicester, will be representative of the general products of the company, from the heaviest primary stone-breakers to small crushers suitable for builders' use. There will also be an example of a Vitex screen suitable for quarries and gravel pits, and a selection of concrete mixers of various types and sizes, and, lastly, a typical portable belt loader. (Stand 1312, outside.)

★H. E. C. COMPRESSORS AND ENGINES, LTD., Levis Works, Stechford, Birmingham, 9, will be exhibiting a range of single-stage air-cooled compressors. These will include two automatic stationary compressors, several portable models, and four mobile units. (Stands D, 739 and 638.)

A new compressor and a host of recently developed pneumatic ancillary equipment will be featured on the stand of the HYMATIC ENGINEERING CO., LTD., Redditch, Worcs, in addition to a selection of other Hymatic products. The new compressor, model HMS7P, with its four-stroke J.A.P. petrol engine, has been designed principally for the building and agricultural trades. Prominent among the ancillary equipment will be the new pressure feed containers for spray painting. (Stand D, 136.)

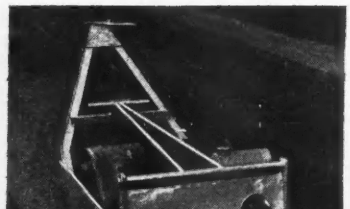
C. H. JOHNSON (MACHINERY), LTD., Adswood-road, Stockport, will be exhibiting on their stand a new range of 2-in. and 3-in. centrifugal pumps; a 4-in. diesel pump; a 4-in. diaphragm pump; and a 4-in. 16-h.p. electric centrifugal pump. Also portable conveyors; a new dumper; Power and Frog's rammers; a diesel pile driver; concrete vibrators; vibrating screened units; and concrete vibrating tables. (Stands 1329, 1228, outside.)

W. KENNEDY, LTD., Station Works, West Drayton, Middlesex, will be showing their full range of bending machines for pipes, light-gauge tubes, bars, angles and other sections, all of which are bent cold and unloaded. Demonstrations will be given daily, and examples of work will be shown. (Stand D, 434.)

★KWIKFORM, LTD., 194, Waterloo-road, Birmingham, 25, are exhibiting their range of builders' equipment, including their unit frame scaffolding system with their patented adjustable bases and ancillary fittings and their systems of suspended formwork and wall shuttering. One exhibit shows their new patented flexible formwork and its application to vertical circular concrete tanks and as shuttering for shell roof construction. (Stand B, 613.)

LINER CONCRETE MACHINERY CO., LTD., P.O. Box No. 12, Park-road, Gateshead, 8, will be showing their range of mixers; concrete block and brick machines; tile machines; chain saws and saw benches; electric vibrators and vibrating tables. Of particular interest will be the Trailex junior mixer and the Trailex model Portasaw (engine driven saw-bench), both for towing behind vehicles. (Stand 1308, outside.)

From left to right: Shunting tractor, 3 cu. yd. dumper, a ¾ cu. yd. "Hi-Lift" loading shovel, 1 cu. yd. "Hi-Lift" loading shovel, ¾ cu. yd. moving jib type digger, 2 ton mobile crane. (Chaseside Engineering Co., Ltd. Stands 1305 and 1204, outside.)



Self-propelled vibrating roller. (Stothert and Pitt, Ltd. Stands 1101 and 1000, outside.)

★ R. A. LISTER AND CO., LTD., of Dursley, Gloucestershire, are confining their exhibit to a display of their auto-trucks. All the models to be seen have a 600 c.c. single cylinder engine with gear box giving two forward speeds, and one reverse gear drive. The 1-ton capacity tipping model (NPS/NU9G) has been designed for handling wet concrete and similar loads. (Stand D, 205.)

MILLARS MACHINERY CO., LTD., Thorley Works, Bishops Stortford, Herts, are exhibiting a range of their civil engineering contractors' plant, including plant for the production of hot asphalt and coated macadam, concrete mixers and pumps. Also demonstrations will be given of their Wellpoint dewatering system. (Stand 1304, outside.)

A full range of "Morrisflex" flexible shaft machines, equipment, accessories and tools from small dental equipment to the larger machines designed for the heaviest work in the engineering, foundry, motor, stone and glass industries, will be exhibited by B. O. MORRIS, LTD., Claylane, Coventry. (Stand D, 421.)

A representative range of scrapers, rippers and angledozers may be seen among the exhibits of ★ ONIONS AND SONS (LEVELLERS), LTD., Moxley-road, Bilston, Staffs. The 8-yd. scraper, model "AK," is a newcomer. This machine has been developed to comply with specifications drawn up by the Ministry of Supply experimental station. A large ripper has been added to this firm's range for rock breaking, being originally constructed to dig limestone rock in a situation where blasting was forbidden. (Stands 1335 and 1234, outside.)

★ PEGSON, LTD., Coalville, Leicestershire, are to exhibit a selection from their range of plant for quarry owners and contractors. A machine which will be exhibited for the first time is the 8B primary type gyratory crusher. These machines are also available in other sizes, namely 13B, 16B and 25B, the figure indicating the size of the feed opening. The Pegson range of centrifugal self-priming pumps will also be well represented. (Stand 1311, outside.)

The E. J. Morgan suction-blow spray gun type 3 is being exhibited and demonstrated by THOMAS SADLER, SONS AND CO., 62, High-street, Croydon. This is a development of the E. J. Morgan cement gun; whereas the latter requires an aerated cement, the present gun will deposit ordinary mixtures up to 3 to 1 and will pass gravel 1-8 in. sieve or less. (Stand D, 159.)

The new prototype 28-in. self-propelled vibrating roller, complete with petrol engine, and also the hand-propelled and trailer version are being shown by ★ STOTHERT AND PITT, LTD., of Bath. These will be accompanied by a comprehensive range of other machinery. (Stands 1101 and 1000, outside.)

Electricity and industrial boiler house plant is shown by ★JOHN THOMPSON, LTD., Ettingshall Works, Wolverhampton, as well as steam generating and food and chemical plant, pressed steelwork and iron foundry. (Stands D, 521 and 418.)

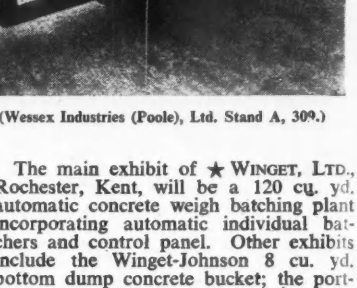
3-h.p. motor truck. (Wessex Industries (Poole), Ltd. Stand A, 309.)

The latest version of the Thwaites builders' hoist will be an outstanding feature on the stand of THE THWAITES AGRICULTURAL ENGINEERING CO., LTD., The Parade, Leamington Spa. This machine is suitable for use in building construction of all types, but particularly for two- or three-storey buildings or traditional houses. Bricks, tiles, blocks, small lintols, etc., are hoisted equally well, and concrete is carried in a special tipping skip. (Stand 1344, outside.)

★S. TYZACK AND SON, LTD., 341-5, Old-street, London, E.C.1, are exhibiting their usual range of woodworking machines. Of particular interest to the builder and cabinet maker is the combination woodworker. This is a machine devised specially for workshops with limited space and it is fitted with self-contained motor drive. Also on show will be the "Zyto" dimension saw-bench with canting saw and a sliding table 36 in. by 24 in., running on ball bearings, and "Zyto" heavy-duty spindle moulder. (Stand B, 714.)

The range of "Wrigley" motor trucks has been extended considerably since the last B.I.F., and now includes models with pressed metal tipping bodies and interchangeable flat platforms, ideally suited for work on building sites and for use in conjunction with concrete mixers. A selection will be exhibited by ★ WESSEX INDUSTRIES (POOLE), LTD., West-street, Poole, Dorset. Model No. 208 is capable of easy handling by unskilled labour under loose or rough conditions. The range also includes heavier tug and general purpose types with 3-h.p. engine units having three speeds and reverse gears. (Stand A, 309.)

The main exhibit of ★ WINGET, LTD., Rochester, Kent, will be a 120 cu. yd. automatic concrete weigh batching plant incorporating automatic individual batchers and control panel. Other exhibits include the Winget-Johnson 8 cu. yd. bottom dump concrete bucket; the portable twin trolley batcher (a new device for concrete weigh batching); the 10NT non-tilt mixer; the 7T/H hopper-fed tilting mixer; the 3½T hand-fed tilting mixer and the 3½T trailer mixer. (Stands 1307 and 1206, outside.)



Electric tools. (Wolf Electric Tools, Ltd. Stand C, 603.)

A complete display of electric tools comprising portable drills, screwdrivers, grinders, polishers, sanders, blowers, chisel mortisers, hammer kits, a range of engine reconditioning equipment, including valve seat grinders and valve and engine servicing kits, valve refacers, the "Mobilelectric" engine workshop and the range of "Wolf" solderguns, will be exhibited by WOLF ELECTRIC TOOLS, LTD., Hanger-lane, Ealing, W.5. (Stand C, 603.)

The Stand of John Thompson, Ltd. Designed by Dr. C. Franck, Dipl. Ing. (Stand D, 521/418.)

Structural Components

D. ANDERSON AND SON, LTD., Stretford, Manchester, are exhibiting a full range of Red Hand roofings, linings, insulating felts, and dampcourses: insulated roof deckings, Thermosteel and Thermolok (aluminium): Thermotile, Durodek, Macasfelt, and other flat roof systems. In addition, they are showing Siderosthen anti-corrosive paint, and Sideroleum wood preservative. (Stand B, 625.)

The main structure of the stand of FREDK. BRABY AND CO., LTD., 352-364, Euston-road, London, N.W.1, will consist of a structural steel framework, incorporating metal windows, metal partitions, doors and dovetail sheeting, while the free standing exhibits will include pressed steel stairs, door frames, tanks, cisterns and cylinders, gutters and pipes, barrows and rooflights. (Stand B, 611/508.)

The exhibit of the BRITISH ALUMINIUM CO., LTD., 46, Berkeley-square, S.W.1, will be confined to two of the range of British Aluminium products, "Rigidal" corrugated aluminium sheet and Super Purity Aluminium, both with particular application to the building industry, and the latter having merits as a cheap and efficient alternative to sheet-lead. (Stand D, 605.)

BRITISH CORK MILLS, LTD., 167, Victoria-street, London, S.W.1, will include on their stand a display of corkboard for lower temperature insulation in cold stores, refrigerators, etc., a wide range of granulated cork from 200 mesh up to 2 mesh, which is used for low-temperature insulation, rubber-cork compositions, flooring anti-condensation paints, etc., and cork flooring tiles. (Stand B, 211.)

The stand of THE BRITISH PLASTER BOARD, LTD., Wallasey, Cheshire, will present a three-fold display of the advantages to be gained by the use of gypsum materials in modern building construction. These especially are its fire-resistance, its possibilities, and its adaptability. (Stands B, 511 and 410.)

★W. H. COLT (LONDON), LTD., Surbiton, Surrey, will be showing on their stand "Colterro" electrically kilned plaster lathing, "Coltenite" cement waterproofer, "Coltenard" cement hardener, and "Colt" Canadian cedar-wood shingle tiles. ★COLT VENTILATION, LTD., also of Surbiton, will be exhibiting a range of their industrial and domestic ventilators. (Stand B, 721.)

GUEST KEEN AND NETTLEFOLDS (MIDLANDS), LTD., BOX NO. 24, Heath-street, Birmingham, 18, will have two stands. On the inside stand they will exhibit screws, bolts and nuts of all descriptions, Hank rivet bushes, aluminium alloy nails and steel hinges of all descriptions. The outside stand will include engineering hand tools, wrought-iron gates and fencing and wrought-iron staircases. (Stands B, 629 and 526 and 1321 and 1220 outside).

HALE AND HALE (TIPTON), LTD., Dudley Port, Tipton, Staffs, will be exhibiting a display of roof-support devices and also examples of their manhole step irons cast from Blackheart malleable iron in accordance with British Standard 1247/45, and other machined and unmachined castings in use in the building and allied industries. (Stands D, 609 and 508.)

The main exhibit of HILLS (WEST BROMWICH), LTD., Albion-road, West Bromwich, will be a full-size section of a typical school embracing Hills' "Preswéld" frame construction based on the 8 ft. 3 in. square modular plan. A complete school unit is formed with their "Hilcon" precast reinforced concrete roof wall and floor units; metal windows with pressed steel surrounds and sheet metal stanchion casings and door frames. (Stands B, 615 and 512.)

★HOLOPLAST, LTD., New Hythe, near Maidstone, Kent, will be displaying "Holoplast" laminated structural plastic panels and linings, also the latest addition to their range of production," "Corroplast," which is the registered trade name for a corrugated roofing sheet manufactured from the same raw materials as their other "Holoplast" products. (Stand B, 315.)

THE NORTHERN ALUMINIUM CO., LTD., of Banbury, Oxfordshire, will display, on their stand, examples of the various rolled products in Noral alloys: sheet, coil, circles, plate, and slugs for impact extrusion. At the front of the stand will be arranged a small selection of some of the end products made from sheet. The stand itself is constructed entirely of aluminium sheet products and extrusions. (Stand D, 629.)

Acid-resisting materials for the construction of floors, tanks, tank linings, drainage channels, effluent schemes, neutralising sumps, pits, etc., are being presented by PRODORITE, LTD., Eagle Works, Wednesbury, Staffs. Examples of metal spraying for the protection of steel parts, e.g., window frames, etc., may also be seen. (Stand D, 433.)

CHARLES RICHARDS AND CO., LTD., of Darlaston, Staffs, will exhibit on their stand a display of black and bright bolts and nuts, telegraph ironwork, railway fastenings, rivets, high-tensile bolts, Staffordshire Knot brand carriage bolts and nuts, Burston adjustable cam spanner, bright drawn steel and bright repetition work. (Stand D, 753.)

The principal feature of the stand of the RUBEROID CO., LTD., Commonwealth House, 1-19, New Oxford-street, W.C.1, is the series of full-size models demonstrating the application of various Ruberoid products in building. Ruberoid mineral surfaced roofing is exhibited together with Ruberoid flexible strip slates and the Ruberoid insulated metal roof. (Stand B, 423.)

On the stand of RUBERY OWEN AND CO., LTD., Darlaston, South Staffordshire, will be exhibited a display including agricultural machinery and equipment; bolts and nuts; office and works metal equipment; pressed steel split pulleys; structural steelwork, and steel storage equipment. (Stands D, 717 and 616.)

THE STANTON IRONWORKS CO., LTD., nr. Nottingham, are showing on their outside stand examples of their spun concrete pipes, flexible joints, manholes, bends, junctions, sleepers, flags and kerbs, and also spun concrete lighting columns and transmission poles. On their inside stand they are exhibiting spun iron pipes to British and Continental standards, flexible joints, special castings and concrete-lined iron pipes. (Stands 1326, outdoor, and B, 717 and 626.)

"Big Ben" tubular scaffolding comprising aluminium alloy tube and drop forged mild steel scaffold fittings of the "Big Ben" pattern together with tubular painters' trestles and adjustable steel stands, are being shown by the ★STEEL SCAFFOLDING CO., LTD., 82, Victoria-street, S.W.1. (Stand B, 605.)

A selection of "Wireweld" steel reinforcing fabrics and "Twisteel" bars is being exhibited by ★TWISTEEL REINFORCEMENT, LTD., Alma-street, Smethwick, Staffs. (Stands B, 309 and 208.)

The exhibits on the stand of THE UNITED STEEL COMPANIES, LTD., 17, Westbourne-road, Sheffield, 10, will include three models illustrating the production of iron and steel; a display of stainless steel in the form of cold rolled strip, sheets and tubes; a large roller forging and other heavy forging products of a like nature. (Stand D, 519.)

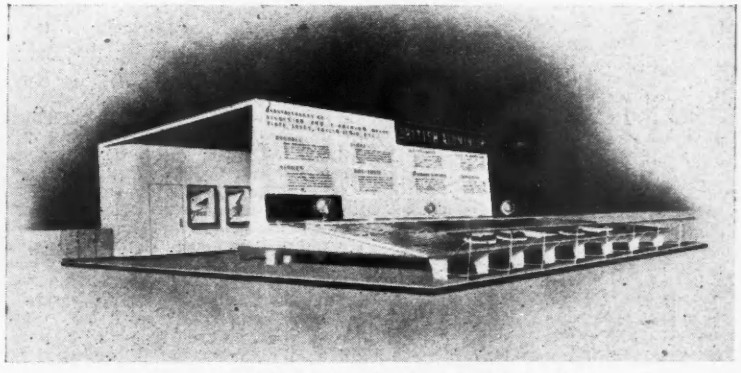
THOS. W. WARD, LTD., Albion Works, Sheffield, and subsidiary companies, will have two stands. They will be designed to show the activities of the various companies of the group which include many branches of engineering; the supply of raw materials; and the provision of various services to industry. (Stands D, 719 and 1360, outside.)

Heating and Services

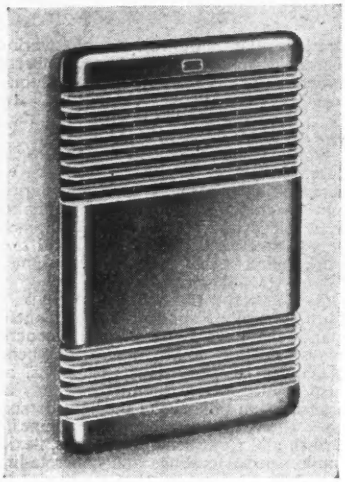
A marine-type oil fuel burner is among the principal exhibits shown by ASSOCIATED BRITISH COMBUSTION, LTD., Meonstoke, Hampshire. The burner has been specially designed to meet requirements for both marine and land oil installations. (Stand D, 334.)

AUTO DIESELS, LTD., of Uxbridge, are exhibiting a selection from the standard range of generating and lighting equipments which they manufacture from 500 watts to 80,000 watts. These equipments have a wide range of application as they are used by leading public works contractors and British Railways for floodlighting and also for providing power for electric tools, also for lighting on opencast coal sites. (Stands 1323 and 1222, outside.)

New lighting fittings, which have been added to their range, are shown by ★BERRY'S ELECTRIC, LTD., Newman-street, W.1. There are ceiling pendants, wall brackets, table and floor standards in many different patterns, carved chandeliers, designs in wrought iron, brass and hewn oak, fabric shades, and some examples of modern decorative glass. Among the heating exhibits there are a number of "Magicoal" period



The stand of The British Aluminium Co., Ltd. (Stand D, 605.)



Insert type Thermovent heater. (E. K. Cole, Ltd. Stand C, 403.)

reproduction fires as well as the range of smaller "Magicoal" types and "Haloberry" radiators. (Stands C, 507 and 406.)

A comprehensive display of Solectra electric fires is presented by BRATT COLBRAN, LTD., 10, Mortimer-street, W.1. The Sunrise model is now fitted with a flicker device, giving the effect of live, moving flames. In addition to the standard Sunrise, variations in brass and rustless steel, suitable for period settings, are also exhibited. (Stand C, 504.)

Their small paraffin-fired domestic hot water boiler, which appeared for the first time at last year's show, is displayed again by the BROCKHOUSE HEATER CO., LTD., Victoria Works, West Bromwich, who are also presenting the self-stoke automatic gravity feed boiler, showing its particular application to glasshouse heating. (Stands D, 405 and 304.)

The "Hotway" controlled immersion heater will be featured by the ★CAMPBELL ENGINEERING CO., LTD., Bromley, Kent. The temperature-regulating device is automatic and consists of a removable thermostat housed in a separate pocket. Other exhibits include the "Hotway" rapid water heater, Campbell radiators, "Pillar" metal ironing-tables, domestic scales, ceiling airers and bathroom fittings. (Stand A, 326.)

E. K. COLE, LTD., Southend-on-Sea, Essex, are showing lighting, heating and plastic products. "Thermovent" electric space-heaters (convectors), as well as domestic types, both inset and floor-standing, and steel-cased industrial and marine types, are shown. A comprehensive range of the type of plastic moulding suitable for all branches of industry may also be seen. (Stand C, 403.)

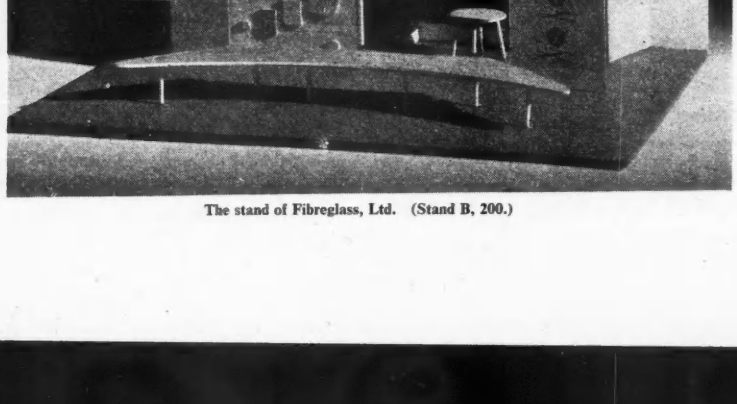
Five examples of a recently introduced range of totally enclosed, fan-cooled, squirrel cage motor are to be placed on view by the ★ENGLISH ELECTRIC CO., LTD., Queen's House, Kingsway, W.C.2. These are known as type "LJ," and have been specially designed for operation in dust-laden and dirty situations. The fan-cooled motor has its windings totally enclosed and isolated from the surrounding atmosphere. (Stands C, 613 and 512.)

Working models displayed by FIBREGLASS, LTD., St. Helens, Lancs, demonstrate the uses of "Fibreglass" heat insulation. They are also showing a boiler in the centre of the stand, with a district heating scheme on one side and an overhead steam system on the other, the latter feeding a turbine and then passing out to process work and factory heating. A large panel displays the latest developments in superfine fibres—fibres 500 times finer than a human hair—for aircraft insulation and other special applications. (Stand B, 200.)

The important part which gas plays in aiding Britain's industrial output, and particularly the export trades, is the keynote of THE GAS COUNCIL, 1, Grosvenor-place, S.W.1, stand, which includes, in addition to a section devoted to the industrial uses of gas, both commercial and domestic exhibits representative of the latest trends and developments in the industry. (Stands D, 639 and 538.)

Included in the display of modern stoves and combination grates which HATTERSLEY BROTHERS, LTD., Mexborough, Yorks, are showing is the "Snowdon" continuous burning fire. This unit, which can be installed with the standard type of tiled surround, has recently received the approval of the Ministry of Fuel and Power for inclusion on their list of appliances for national housing schemes. The fire is designed for burning all solid smokeless fuels or bituminous coal. (Stand A, 600.)

L. G. HAWKINS AND CO., LTD., 30-35, Drury-lane, W.C.2, are showing a range of pressure cookers. In addition to the "Hawkins-Universal" pressure cooker, visitors may also see the 5 and 10 lb. pressure vent weights suitable for both fruit and vegetable bottling. Another line on show is the new automatic heat-controlled iron, model LGH.1220. This iron, made under licence from America, embodies the latest ideas developed there. (Stand C, 723.)



The stand of Fibreglass, Ltd. (Stand B, 200.)

The "Lynx" Cistern. (Shires and Co. (London) Ltd. Stand B, 622.)

THE HOTPOINT ELECTRIC APPLIANCE CO., LTD., of Crown House, Aldwych, W.C.2, exhibit an array of products which will include a restyled washing machine, model CF, which, while retaining all the features of earlier models, has a push-button motor starting switch. Hotpoint, who only recently entered the refrigeration business, show for the first time their latest model with a plate glass work surface, the H.30, which has a net storage capacity of 4½ cu. ft. (Stand C, 513.)

The wiping technique for jointing J. and P. aluminium-sheathed cables is demonstrated by JOHNSON AND PHILLIPS, LTD., Charlton, London, S.E.7. Demonstrations, which are given at frequent intervals, show how the aluminium sheath can be stripped and how, once the sheath is tinned with the special solder, the joint is completed in the normal manner using standard plumbers' metal. (Stands C, 413 and 312.)

Many examples from their range of water heating and storage apparatus are displayed by RANGE BOILERS, LTD., Stalybridge, Cheshire. They include copper hot water storage cylinders; indirect cylinders; calorifiers (both steam and water heated); domestic back boilers in steel and copper; the "Fortic" patent combination tank combining cold water supply tank and hot water cylinder in one unit; and the "Hercules" instantaneous water boiler suitable for cafés and canteens. (Stand B, 300.)

The "Barrywald" sanitary incinerator may be seen on the stand of ★SANIGUARD APPLIANCES, LTD., 62, London Wall, E.C.2. (Stand B, 205.)

"Lynx" high and low level cisterns are displayed by ★SHIRES AND CO. (LONDON), LTD., Norman Buildings, Central-street, E.C.1. The essence of the design is that the cistern, although capable of flushing three gallons of water, does not take up any more space than the present two-gallon size. The shell is moulded in Duranite and the patent piston bush makes it virtually impossible for the piston to stick. (Stand B, 622.)

The principal exhibit shown by SAMUEL SMITH AND SONS, LTD., Smethwick, Staffs, is the "Rosslyn" oven-over-fire all-night-burning combination grate.

which is on the Government list of approved appliances for the housing programme; on the same list is the "Ther-Co-Oven" semi-heat storage cooker, which is thermostatically controlled by one knob. (Stand B, 301.)

Bricks, Concrete Blocks, etc.

A range of new designs in "Bell" fireplaces constructed in faience and tiles, glazed rustic briquettes and multi-colour slate, red sand-faced bricks, etc., is shown by ★A. BELL AND CO., LTD., Gold-street, Northampton. Also to be seen is a new series of hand-painted tiles in blue, sepia and other colours, depicting costumes through the centuries, ancient and historical buildings, American ancestral homes, land- and sea-scapes, etc., as well as a section of a reproduction, in hand-painted tiles, of the Bayeux Tapestry. (Stand B, 420.)

★ THE NORTH BRITISH RUBBER CO., LTD., of Edinburgh, have used their own rubber flooring on their stand as part of the exhibit. It is of 18-in. tiles set diagonally alternating between green/white and black/white marblings with half-inch lacing in contrasting colour. An easel on the stand itself gives further examples of colourful rubber flooring. Other rubber products for industry, such as rubber-proofed industrial garments, protective footwear, tubing, matting, also have their place in this exhibit. (Stand D, 138.)

The entire stand of ★J. H. SANKEY AND SON, LTD., Ilford, Essex, is devoted to a display of the heat- and acid-resisting materials of the refractories division of the firm. The materials exhibited are the range of fire cements, "Pyruma," "Siluma" and "Aluma"; "Tiluma" tile cement; Sankey firebricks, including "Best Stourbridge," "B. M. Scotch" and "Aluma" brands; also Sankey vitrified blue acid and alkali-resisting bricks and acid-resisting cement. (Stand B, 405.)

Paints, Finishes, Preservatives

The stand of C. R. AVERILL, LTD., 22, Duchy-street, Stamford-street, S.E.1, will comprise two showcases exhibiting finished graphite products, and, in the rear, a lounge. The firm's display of "Avarc" graphite specialities will include the three main pure flake lubricating graphites—No. 1 coarse, No. 2 fine, and No. 3 very fine, and "Avarc" graphite pipe joint compound which is used largely for steam flanged and screwed joints; also "Avarc" graphite bond which is a new preparation specially prepared for all types of hot and cold screwed and flanged oil or petrol joints. (Stand C, 202.)

The main feature of the exhibit of ★BAKELITE, LTD., 18, Grosvenor-gardens, S.W.1, will be the "Bakelite," "Warerite" and "Vybak" plastics travelling exhibition. It is arranged in two series of self-contained units, the first dealing with the company's products by product groups. Each of these units is designed to emphasise the properties of Bakelite synthetic resins and adhesives, phenolic and urea moulding materials, laminated sheet, rod and tube, etc. (Stand C, 404.)

Finishes for the metal, plastic and wood manufacturing industries, insulating varnishes for electrical industries, and new surface coatings, incorporating co-polymerised styrene, for the transport industry, will all be shown by LEWIS BERGER AND SONS, LTD., Berkeley-square, W.1. (Stands B, 621 and 518.)

Stoving enamels in various colours, suitable for either one- or two-coat finish on both infra-red stoving and stoving by the normal convection gas or electrical oven, will be shown by BITULAC, LTD., Collingwood-buildings, Newcastle-on-Tyne. These enamels may also be applied to other types of work, such as steel furniture, bicycles, typewriters, electrical fittings, hardware, etc. (Stand B, 710.)

Paints for a wide variety of purposes —aircraft, building, decoration, marine, industrial, transport and wood finish— are to be presented by CELLON, LTD., Kingston-on-Thames. Particular prominence will be given to Cellon aircraft finishes and Cellon pre-treatment primer. (Stand B, 527.)

THOMAS DE LA RUE AND CO., LTD. (plastics division), 84-86, Regent-street, London, W.1, have a stand which deals entirely with the industrial uses of plastics. Delaron and Traffolyte engraving and interlaminate printed materials are shown, together with a number of examples of the uses of Delaron in constructional and electrical work. Other samples of Delaron include the odourless material for use in refrigerators and similar applications. (Stand D, 612.)

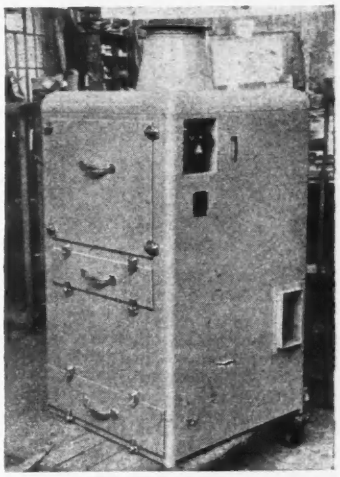
In addition to the magnesium anodes of standard type generally used for the protection of buried pipe lines, new types of Elektron magnesium anodes will also be displayed by F. A. HUGHES AND CO., LTD., 82, Piccadilly, W.1, including a newly patented "booster anode," which is designed specially for the protection of structures in sea water. "Cathweld" connections will be shown for the first time. (Stands 1339 and 1238, outside.)

A small-scale model of a modern metal pre-treatment plant will be the central exhibit on the stand of JENOLITE, LTD., Piazza-chambers, Covent Garden, W.C.2. This model consists of four tanks in a row, a degreaser, two jenolizing (rust preventative) tanks and a hot rinse tank. New Jenolite products include a paint stripper (P.S.5) and an aluminium keying solution, which provides a keying surface for aluminium panels. (Stand B, 221.)

★JENSON AND NICHOLSON, LTD., Carpenter's-road, Stratford, E.15, are showing a full range of their industrial finishes, including 30-minute rivelling enamel, highway transport finishes, seaborne marine finishes, insulating and finishing varnishes for the electrical industry, etc. Details of recent developments, such as Lacwatt impregnating varnish, suitable for use on enamelled wire, and J. and N. wash primer, may be obtained on the Stand. (Stand B, 314.)

The Sealantex decorative liquid stone compound and Sealocrete liquid stain are new products which have been placed on the market since the last B.I.F. by SEALOCRETE PRODUCTS, LTD., Macbeth-street, London, W.6, and will be on view this year. An array of cement work coloured with Sealantone liquid colours, will be another feature of this stand as will also Sealocrete double strength premix solution which may be added to cement and concrete to produce a case-hardened, waterproof and dustproof result. (Stand B, 614.)

Examples of architectural ironwork rust-proofed by the sherardizing process will comprise a display by the ZINC ALLOY RUST-PROOFING CO., LTD., Shakespeare-street, Wolverhampton. The stand will form a technical information bureau where visitors will be able to obtain full particulars of the process, its cost, and details of the uses to which it can be put in the various trades. (Stand B, 724.)



Unit dust collector. (Airscrew Co. and Jicwood, Ltd. Stand D, 726.)

Equipment and Fittings

The main exhibit of the AIRSCREW COMPANY AND JICWOOD, LTD., Weybridge, Surrey, will be ranges of axial flow and centrifugal type fan units and examples of lightweight insulated transit cases. The firm will also introduce their self-contained unit dust collector, which consists of a centrifugal fan, motor, primary dust separator and secondary panel filter housed in a mild steel cabinet. (Stand D, 726.)

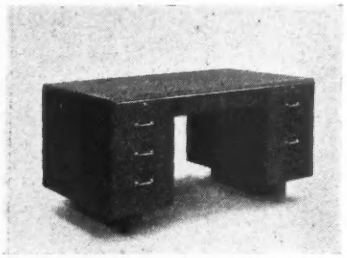
Staircase balustrading and balcony railing will be found on the stand of BAYLISS, JONES AND BAYLISS, LTD., of Wolverhampton. The balustrading is made up of ornamental wrought ironwork, with bronze figures let in, and extruded bronze handrail. Other exhibits include telegraph ironwork, railway fastenings, fencing and gates suitable for all purposes, agricultural components, etc. (Stand 1,330, outside.)

A comprehensive selection of brass and copper, consisting of sheets, tubes, strip, wire, etc., is to be displayed by the BIRMINGHAM BATTERY AND METAL CO., LTD., Selly Oak, Birmingham. Also on view will be copper water service tubes suitable for use indoors or underground (B.S.S. 659 and 1,386, respectively), together with copper roofing sheets. This firm make a speciality of large and heavy work both in tubes and plates. (Stand D, 514.)

Copper tubes and roofing sheets will be the chief exhibits of interest to builders on the stand of THOMAS BOLTON AND SONS, LTD., Widnes, Lancs. (Stand D, 745.)

A prominent feature of the stand of BRITISH INSULATED CALLENDER'S CABLES, LTD., Prescot, Lancs, will be a comprehensive display of cables and wires, including among the larger cables a range of oil-filled, impregnated pressure, and solid type high voltage cables. A new product on view will be the 33-kV aluminium-sheathed impregnated pressure cable, claimed to be more economical, lighter and smaller than the conventional lead-sheathed type. (Stand C, 314.)

A safe cabinet, a safe file, a records cabinet and a standard quality door which will be built into the stand, are among the items to be shown by ★ CHUBB AND SONS, LTD., 40-42, Oxford-street, W.1. The newest items on display



Steel office desk. (Constructors, Ltd. Stands D 401 and 300.)

will be rivetless brass padlocks which are made from one piece of metal. The bolt has a shaped head which makes substantial contact with the internal machined face in the body of the lock and resists any attempt at upward thrust or strain on the shackle. (Stand B, 609.)

"Bantam" sliding door gear, designed primarily for the use of the building trade, will be a feature of the exhibit of CLARKE ELLARD ENGINEERING CO., LTD., Works-road, Letchworth, Herts. The firm will also show "Rolls" sliding door gear suitable for factories, garages and various agricultural buildings. (Stand B, 707.)

CONSTRUCTORS, LTD., Tyburn-road, Erdington, Birmingham 24, are exhibiting steel works and office equipment including racks, bins, shelving, partitioning, benches, tool stands, lockers, and trestles. (Stands D, 401 and 300.)

The Nelson "gun" for end-welding studs, pins, tubes and similar items will be shown by CROMPTON PARKINSON, LTD., Crompton House, Aldwych, W.C.2. Various fluorescent lighting fittings may be seen. The decorative fittings will include ceiling and pendant types with panels of translucent material; fluorescent fittings for shop window and display lighting, together with a new Crompton display spot light reflector fitting with colour screens. (Stands C, 413 and 312.)

★ C.S.A. INDUSTRIES, LTD., of Warwick, are showing their complete English Rose kitchen. Made entirely of aluminium and stainless steel, this consists of sink units, wall and floor cupboards, Hazel domestic boiler, Flavel gas cooker, Dual-Freeze refrigerator and Vent-Axia air conditioning. The latest addition is a smooth-running trolley, also made from aluminium and stainless steel and finished in shades to match the kitchen—cream, sea-green or white enamel. (Stands B, 313 and 212.)

A number of "Dexion"-built structures will be displayed on the stand of ★DEXION, LTD., 34, Fouberts-place, W.1. The "Dexion" slotted angle method of construction, it is claimed, enables numerous items of industrial equipment to be erected by unskilled labour. (Stand B, 306a.)

Extension ladders, painter's trestles, "Eclipse" extension trestles, domestic and platform steps, paperhanger's paste board and trestle, also paperhanger's table which folds into a box with the legs and stays retracted inside, will be arranged for inspection on the stand of the ECLIPSE RAIL-TRACK LADDER CO., LTD., Staple Hill, near Bristol. Further improvements, it will be noticed, have been made to the design of the firm's trailer tower ladder, which now incorporates cam adjusters for controlling the clearance between the sliding sections. (Stand B, 418.)

Malleable conduit fittings, "Egatube" non-metallic conduit tube and fittings, light switch gear (industrial and domestic), patented plug-in direct-on starters, plug-in reversing contactors, plug-in star/delta starters, the "Egaspray" all-electric airless spraygun (which is practically in the production stage) will all be found on the stand of ★EGA ELECTRIC, LTD., Holyhead-road, Wednesbury, Staffs. (Stand C, 116.)

An attractive range of decorative fluorescent lighting fittings, suitable for both domestic and industrial purposes, is to be shown by EKCO-ENSIGN ELECTRIC, LTD., of Southend-on-Sea, Essex. Space heaters of various designs may also be seen. (Stand C, 403.)

The LT 700 refrigerator will be prominently displayed among the exhibits of ELECTROLUX, LTD., 153-5, Regent-street, W.1. A small and very simple type of kerosene burner operates the cooling system without any moving parts. On this model the door is lockable. Interesting features of the model 55 suction cleaner may also be inspected. (Stand C, 738.)

In introducing their new range of industrial switchboxes ★FALK, STADELMANN AND CO., LTD., 91, Farringdon-road, E.C.1, claim that they have overcome all the objections in other designs. Cast in iron with a black enamel finish, the box is deep enough to house a rubber silencing gasket under the switch, yet it has been made as shallow as possible for sunk assembly work. In the latter case an adjustable grid is provided which allows each switch to be correctly aligned according to the depth of plaster. (Stand C, 419.)

A new type of ball valve on the diaphragm principle, all working parts being remote from water and not liable to encrustation, is to be shown by ★FLUSHING APPLIANCES, LTD., Meadowbrook-road, Dorking, Surrey. A new waste water trap with removable side plates on both sides for right or left hand fitting may be seen together with aluminium flushing cisterns treated inside with "Alocrom" and enamelled in white or colours outside; also solid cast brass and copper units with underwater lifting action eliminating rubber glands. (Stand B, 704.)

A controlled electric clock system incorporating a large tower clock is to be a principal feature on the stand of ★GENT AND CO., LTD., Faraday Works, Leicester, and all clocks throughout the Fair will be controlled by the master clock in this exhibit. Other products on view will include: fire alarm systems, a staff locator system, floatless control for electric pumps, valves, sluice gates, etc., and electric bells and indicators of all types for industrial, domestic, marine and mining duties. (Stand C, 407.)

A full range of aluminium ladders and steps and, for the first time, the new gravity aluminium loft ladder and light alloy builders' trestles, are being displayed by ★GRAVITY LADDERS, LTD., Pickford-street, Birmingham 5. The strength of the trestles is equal to that of their timber equivalent, although the weight is reduced by more than 50 per cent. (Stands 1219 and 1118, outside.)

A new cooker, similar in appearance to the Gillott unit design, will be given a prominent place on their stand by the GILLOTT ELECTRO-STEAM COOKERS, LTD., of Chalford, near Stroud, Glos. Other items will include: A grill chamber, useful as an additional warming cupboard; an oven measuring 13 in. high by 13 in. wide by 15 in. deep with side and bottom heating and thermostatic control; and a large simmering oven or hotcupboard of the same size, suitable for slow process cooking. (Stand, C, 416.)

Displayed on the stand of G. A. HARVEY AND CO. (LONDON), LTD., Greenwich Metal Works, London, S.E.7, will be a range of perforated metals, ornamental grills, ventilators, cowls and chimneys; woven wire gauze in all meshes and gauges; sheet metal and steel plate-work; steel equipment and gilled tubes. (Stand B, 329.)

★ JAMES HOWDEN AND CO., LTD., 173, Maclellan-street, Glasgow, have marketed a utility cabinet. It is constructed throughout in aluminium and is fitted with one fixed shelf top and bottom. The working top is Formica with a linett finish in beige. The remainder of the firm's standard units are unchanged, with the exception that Formica working tops are being fitted to all units in place of vitreous enamel. Other items of kitchen equipment will also be shown. (Stand B, 610.)

IMPERIAL CHEMICAL INDUSTRIES, LTD., (Metals Division), Kynoch Works, Witton, Birmingham, 6, will be staging a comprehensive display of their principal products—sheet, strip, tubes, rod, extrusions and wire, in copper, aluminium and their alloys. One feature is a half-section of a double purlin roof built up from channels, angles and corrugated sheet in aluminium alloys. (Stands D, 409 and 308.)

THE JACKSON ELECTRIC STOVE CO., LTD., 143, Sloane-street, S.W.1, are exhibiting an extensive range of their electrical cooking apparatus. Prominence is given to the recently modified models of the "Cleanline" series of domestic cookers. The modifications carried out are mainly concerned with the exterior appearance. At least 50 per cent. of the models on this stand are shown in bright shades, of vitreous enamel. (Stands C, 411 and 310).

RICHARD JOHNSON AND NEPHEW, LTD., Bradford Ironworks, Forge-lane, Manchester, 11, will be displaying all ferrous and non-ferrous wires for industrial and agricultural use. (Stands B, 417 and 320.)

★ LACRINOID PRODUCTS, LTD., Gidea Park, Essex, will be showing plastics door furniture and housing fitments, handles for furniture, building, and paint brush industries, finger plates, pulls and knobs for all industries, technical mouldings, Lacrinite speciality mouldings, ornamental and decorative castings. (Stand A, 623.)

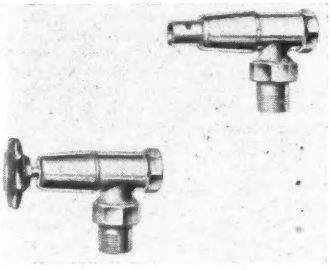
★ JAMES H. LAMONT AND CO., LTD., Gylemuir Works, Edinburgh, manufac-

The "Gillott" electro-steam cooker and hot-water heater. (Gillott Electro-Steam Cookers, Ltd. Stand C, 416.)

turers and patentees of the "Securex" compression joint for copper tubes will be displaying a full representative range of their products, including illustrations of their fittings as used on copper tubes for underground use, on gas installations and also a number of ship and towel rail fittings. (Stand B, 630.)

LAMSON ENGINEERING CO., LTD., 6, 7 and 8, Hythe-road, Willesden Junction, London, N.W.10, will be showing their type "C" mobile conveyor, which lifts 1 cwt. to a height of 9 ft. 6 in. and a new model, the type "E," which can elevate a load of 3 cwt. to 9 ft. 6 in. They will also be showing a range of portable vacuum cleaners. (Stand D, 140.)

A comprehensive range of plumbers' and engineers' water fittings is shown by MANLEY AND REGULUS, LTD., Showell-road, Wolverhampton. The hot brass pressing department, in addition to pressings for water fittings, also produce a very wide range of pressings for the gas, refrigerator, motor and electrical trades. (Stand B, 312.)



Radiator valves. (Manley and Regulus, Stand B, 312.)

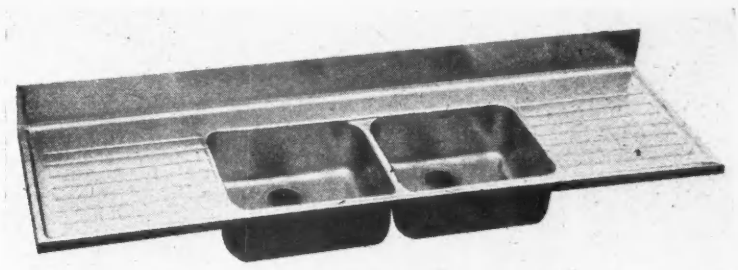
Particular attention to coloured bathroom suites is being given by MORRISON, INGRAM AND CO., LTD., Hadfield-street, Cornbrook, Manchester. Two new baths may be seen, one being fitted with dual grips, and the other, the Cornbrook Junior, being termed a luxury bath with step-down front and enamelled iron panels. This firm is also showing for the first time a disinfectant deodoriser. (Stand B, 713.)

★ NORRIS PLANES AND TOOLS, LTD., Purley Way, Croydon, will be exhibiting steel woodworking planes, plasterers' and bricklayers' hawks, tool-makers' vices, and watchmakers' and other steel screwdrivers. (Stand D, 121.)

JOSIAH PARKES AND SONS, LTD., of Union Works, Willenhall, are showing a new cylinder rim night latch. The bolt is automatically dead-locked against end pressure when it strikes the staple. The knob may also be dead-locked by the key, providing protection in the event of the latch being fixed to a door having a glass panel. A new nickel-silver key has also been incorporated. (Stand A, 526.)

A representative display of finished brasswork for plumbing and engineering, including bath and sink mixers, self-closing non-concussive taps, shower mixing boxes, hygienic taps, and compression joints to British Standard 864 to suit copper tube to B.S.659/1944, is being presented by ★PEGLERS, LTD., Belmont Works, Doncaster. A special feature of the display will be the B.S. 1010 taps, B.S. 1212 ball valves, and B.S. 1184 traps and wastes. (Stand B, 421.)

Large-scale cooking equipment for hospitals, institutes, hotels, restaurants and industrial canteens will be exhibited on the stand of ★ RADIATION, LTD., Thimble Mill-lane, Birmingham, 1. These will include ranges, hot cupboards, grills, ovens for roasting, steaming and pastry making, fish fryers, boilers and service counters. (Stands D, 545 and 442.)



Stainless steel sink unit as supplied to the U.S.A. (Stainless Steel Sink Co., Ltd. Stand B, 504.)

★SANBRA, LTD., Aston Hall-road, Birmingham 6, and their associated company, CONEX TERNA, LTD., will be showing a wide range of plumbers' brassfoundry including pillar, bib and stop cocks, ball valves, wastes, combination bath and sink fittings, shower fittings, gate and radiator valves, compression joints, fire hose fittings, etc. New designs include the "Typhoon" shower head, the "Uni-flo" tap, Conex compression joints, the "Nerdrip" valve and washer. (Stand B, 623.)

Steel tubes for all purposes, including steam, gas, water, boiler tubes, oil and sewage mains, will be displayed on the stand of STEWARTS AND LLOYDS, LTD., Broad-street Chambers, Birmingham, 1. They will also be showing fittings and joints, lighting columns, fabricated tubular steelwork, pig irons and steel castings. (Stands D, 511, 408 and 1333, 1232 outside.)

On the stand of ★THE TAYLOR RUSTLESS FITTINGS CO., LTD., Ring-road, Lower Wortley, Leeds, 12, who specialise in the manufacture of equipment and articles in stainless steel, there will be a range of equipment for hospitals, laboratories, dye works, dairies and chemical plant and architectural, tram, bus and shop fittings, and a representative range of sinks and sink units. Of special interest will be an exhibit of the type of sink unit that is being exported to North America. (Stand B, 504.)

The Triplex "V" cooker will be shown at work connected to a 50-gallon cylinder for domestic hot water supply, on the stand of ★TRIPLEX FOUNDRY, LTD., Great Bridge, Staffs. Also on view will be the Triplex "38" C/F combination grate, a new model introduced since the last Fair. It is a continuous burning grate designed to meet the latest official requirements. This model will also be at work. (Stand B, 505.)

"Yorkseal" heat retention solid fuel cooker. (Radiation, Ltd. Stands D, 545 and 442.)

WELLINGTON TUBE WORKS, LTD., Great Bridge, Tipton, Staffs, manufacturers of gas tubes and fittings, are showing a selection of tubes, tubulars and fittings, and a considerable range of products incorporating tubular construction. Among the many exhibits showing the application of tubular fabrication principles will be an interesting patented handrailing joint. Also displayed will be examples of fabricated flanged pipework for pressure purposes, together with panels designed for panel heating. (Stand C, 300.)

THE YORKSHIRE COPPER WORKS, LTD., Leeds, are showing their "Yorkshire" patent capillary fittings for light gauge tubes for hot and cold water, gas, heating, waste and engineering pipe lines, together with solid drawn tubes, copper, brass, cupro-nickel and other non-ferrous alloys. (Stands B, 723 and 634.)

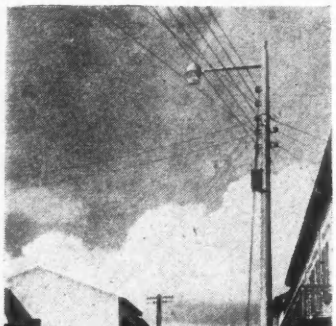
Miscellaneous

B. B. CHEMICAL CO., LTD., Ulverscroft-road, Leicester, show their product "Bostik" and its applications in industry. A further exhibit is "Prestik," a form of extruded sealing material supplied in various sections on reels. (Stand D, 108.)

BRITISH INDUSTRIAL PLASTICS, LTD., 245, Oxford-street, London, W.1, will be represented at the Birmingham section of the Fair by four of their subsidiary companies—B.I.P. Tools, Ltd., Stand C, 327 (Electrical); The Streetly Manufacturing Co., Ltd., Stand C, 307 (Electrical); B.I.P. Engineering, Ltd., C, 307 (Electrical); and Beetle Bond, Ltd., B, 402 (Building). This last-named stand will exhibit two specific applications of Beetle resins, Beetle adhesives for the plywood and woodworking industries, and Beetle resin W.20 which is used for bonding foundry sand cores. The strength of joints made with these materials will be demonstrated.

THE BRITISH OXYGEN CO., LTD., Bridgewater House, Cleveland-row, S.W.1, exhibit Argonarc manual and machine welding equipment for stainless steel, aluminium, magnesium and copper; oxygen profile and portable cutting machines; manual oxy-acetylene welding and cutting equipment. (Stands D, 201 and 100.)

Exhibits covering almost the entire field of battery manufacture will be featured on the stand of CHLORIDE ELECTRICAL STORAGE CO., LTD., Clifton Junction, nr. Manchester. Ranging from large stationary and traction cells to small accumulators, the stand will emphasise the importance of Chloride and Exide



25 ft. mounting height circular column, overhead circuits, Vesta arm. (Poles, Ltd. Stand C, 409.)

batteries in the day-to-day life of the country. (Stand C, 717.)

★ COLOUR SPRAYS, LTD., of Heath-street, London, N.W.3, display a comprehensive range of spraying equipment and air compressor plants. On their stand B500 are on view a series of over 20 types of spray pens and guns covering every requirement for protective and decorative finishes, from pens suitable for artists and photographic work to other models for spray finishing in the electric and gas industries, building, furniture, etc. This firm have branches and agents in most foreign countries, but are still open for export channels.

THE COPPER DEVELOPMENT ASSOCIATION, Kendals Hall, Radlett, Herts, will be showing finished and semi-finished copper and copper alloy products, having applications in engineering, electrical, building and other industries. Particulars will be obtainable of the technical information services provided by the Association. (Stand D, 230.)

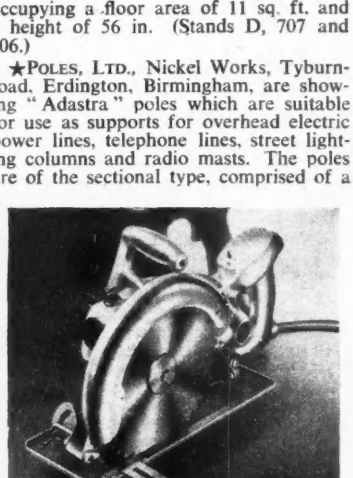
DESOUTTER BROTHERS, LTD., The Hyde, Hendon, London, N.W.9, are exhibiting a comprehensive range of pneumatic and electric portable tools and standardised press tool sets. The pneumatic tools include the recently introduced miniature range of high speed drills, and reversible and forward drive screwdrivers. The electric tools include the new range of 1-4 in. and 5-16 in. capacity drill guns, and screw guns and nutrunners. (Stand C, 415.)

★KANGO ELECTRIC HAMMERS, LTD., Lombard-road, South Wimbledon, London, S.W.19, are exhibiting four types of Kango electric hammers, the "E" type (heavy), the "F" type (medium), the "G" type (small), and the Spade hammer. The "F" and "G" hammers are entirely new models, production of which only commenced at the end of 1949. (Stand D, 720.)

R. H. NEAL AND CO., LTD., of London, W.5, and Grantham, provide a comprehensive range of mobile and portable cranes. Of particular interest is their latest type "GM" 15-cwt. mobile crane, which incorporates power travelling, full circle slewing and hydraulically-operated controls, and is available fitted with either normal jibs or telescopic masts for lifts up to 40 ft. The crane will travel with the jib in any position. (Stands 1203 and 1102, outside.)

The predominating feature of the stand of OZALID CO., LTD., 62, London Wall, London, E.C.2, is their new combined photo-printing machine, incorporating their dry method of reproduction. The machine, the "Duplex Ozaprinter," incorporates both exposure and development sections in one compact unit, occupying a floor area of 11 sq. ft. and a height of 56 in. (Stands D, 707 and 606.)

★POLES, LTD., Nickel Works, Tyburn-road, Erdington, Birmingham, are showing "Adastra" poles which are suitable for use as supports for overhead electric power lines, telephone lines, street lighting columns and radio masts. The poles are of the sectional type, comprised of a

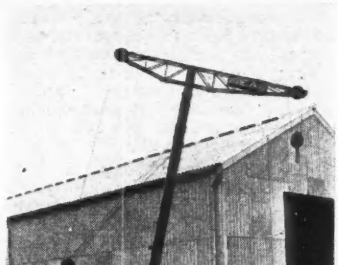


The 9-in. "Ripsnorter" saw. (Van Dorn Electric Tools. Stand C, 607.)

number of tapering tubular sections which assemble together in strong, rigid tapering structure of pleasing proportions. (Stand C, 409.)

PRITCHETT AND GOLD AND E.P.S. LTD., 50, Grosvenor-gardens, London, S.W.1, are exhibiting stationary cells of various sizes and capacities as used for emergency lighting in industry, hospitals, cinemas and schools and for use in power stations and telephone exchanges. Other exhibits on the stand include a typical switch-tripping cubicle; two train lighting cells; three aircraft batteries of various types; and bus and car batteries. (Stand C, 702.)

A range of anti-dermatitis barrier

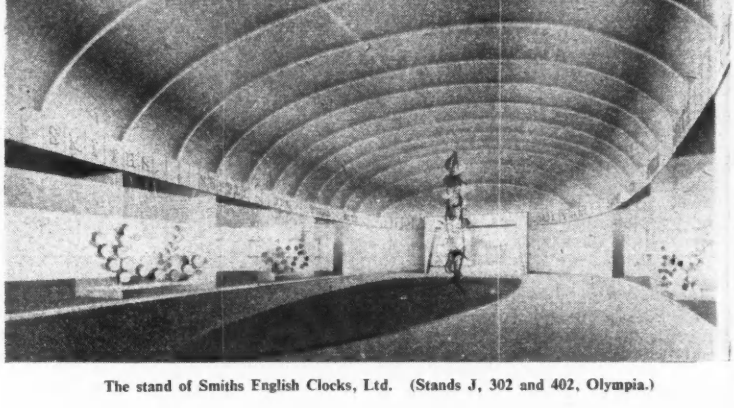


Type "GM," 15 cwt. mobile crane. (R. H. Neal and Co., Ltd. Stands 1203 and 1102, outside.)

preparations forms the principal exhibit on the stand of ROZALEX, LTD., 10, Norfolk-street, Manchester, 2. The Rex Dispenser, an appliance developed by the company to provide an economical and uncontaminated supply of Rozalex to the worker in the factory whenever required, is also being shown. (Stand D, 706.)

★The floor of the stand of STELCON (INDUSTRIAL FLOORS) LTD., Cliffords Inn, E.C.4, was formed of Stelcon anchor steel plates, which have been widely used in most types of factories. Samples of the firm's storage wall units are also available for inspection. These walls are composed of independent self-supporting units made of reinforced concrete to a special design. No bedding down is necessary; they may be laid on level ground and can be loaded either or both sides. (Stand D, 215.)

Portable electric tools for the engineering, building and motor trades are being shown on the stand of VAN DORN ELECTRIC TOOLS, Harmondsworth, Middlesex. These include drills, screwdrivers, tappers, bench and portable grinders, diegrinders, disc sanders, polishers, saws, hammers and valve reconditioning equipment. They are also showing various attachments and accessories for these tools. (Stand C, 607.)



The stand of Smiths English Clocks, Ltd. (Stands J, 302 and 402, Olympia.)

OLYMPIA SECTION

The "Speedivac" range of mechanical pumps for general laboratory, pilot plant and production applications is featured on the stand of W. EDWARDS AND CO., LTD., Worsley Bridge-road, S.E.26. Visitors may also see a wide range of oil and mercury diffusion pumps with speeds ranging from a few to many thousand litres per second, including a 16-inch standard 4-stage pump for large-scale work. (Stand C. 56, Olympia.)

HADLEY SOUND EQUIPMENTS, 587-9, Bearwood-road, Smethwick, are showing staff location and office inter-communication equipment and also special equipment for sports stadiums, for public address purposes. (Stand F, 13, Olympia.)

A display of office furniture, which includes some interesting departures in furniture design and colouring for business establishments, has been organised by the OFFICE APPLIANCE TRADES ASSOCIATION, 11-13, Dowgate-hill, Cannon-street, E.C.4. Even safes, hitherto traditionally coloured black or olive green, are introduced in pastel shades which make them both ornamental and in keeping with the latest types of furniture. (Stand F, 86, Olympia.)

The main feature of the stand of SHELL CHEMICAL MANUFACTURING CO., LTD., St. Helen's-court, Great St. Helen's, E.C.3, is an animated flow chart depicting the various stages in the manufacture of "Teepol." Flanking the chart may be seen panels bearing descriptions of the process and data regarding the applications of the finished product. Related to this central feature is a series of photographs depicting some of the many industrial and cleaning processes in which "Teepol" products may be used. (Stand B, 22, Olympia.)

Horological products ranging from pocket watches to strike and chime mechanisms for church towers and public buildings are being shown by SMITHS ENGLISH CLOCKS, LTD., Waterloo - road, Cricklewood, N.W.2. Many new models for mantel or wall fixing with "Sectric" or lever movements are on view, as well as a range of barometers, thermometers and other weather instruments. The Stands (J. 302 and 402, Olympia) are illustrated on previous page.

THE HOUSING RATIO

N.F.B.T.E. Statement

FOLLOWING Mr. Bevan's announcement in the House of Commons of the new arrangements with regard to private enterprise and local authority housing, the National Federation of Building Trades Employers has issued this statement:

By admitting, at last, that the needs of different local authorities vary widely and by giving them greater latitude, Mr. Bevan has taken a step in the right direction. But he has not gone far enough. The ratio should be abolished altogether and the division of the number of houses allocated to each local authority between private and local authority building should instead be determined by the wishes of those with housing needs. There is not the slightest justification for forcing those who prefer to have houses built for them at no cost to public funds to become the tenants of heavily subsidised municipal houses.

The new decision must result in some increase in the number of new houses built for sale or letting privately, but the increase will not be sufficient to give the private builder anything like the scope he requires in order to make his full contribution towards the reduction of the cost of building. To do this he must be able to develop estates according to a planned programme.

DESIGN FOR AN ARTS CENTRE

Discussion at the A.A.

DESIGNS prepared by architectural students for a suggested central building to house the Institute of Contemporary Arts formed the basis for a discussion held by the I.C.A. at the Architectural Association.

The chairman, MR. J. M. RICHARDS, opening the proceedings, said that one of the justifications for the existence of the Institute was that it would cater for all arts under one roof. There were various ways, he said, in which architecture could be included in the Institute's activities. During the next month or two the Institute would require its own premises, but members were looking further ahead to the time when it could have a central building of its own. Meanwhile members could consider what kind of building would be most appropriate. It had been decided that the most practical way of studying this was to do it through the schools of architecture, and about eight of these schools had produced designs for a building based on the needs of the Institute. The results were being displayed in the exhibition.

Architectural Unity.

MR. R. FURNEAUX JORDAN declared that more and more in future schools of architecture would have to be in touch with real building, but it was very difficult to create conditions under which the architectural student could experience real practice. The essence of the problem that had been set in the exhibition was to combine structures suited for architecture, painting, sculpture, music, drama and other arts, into an architectural unity. An example of such architecture was the R.I.B.A. building. Some of the designs in the exhibition were for buildings on a restricted site, others were for more open sites, in which case the buildings were more spread out and it was more difficult to give cohesion.

Continuing, Mr. Jordan said that it was often the case that architect and client failed to study their problem together. What usually happened with an important building was that first somebody had a rough idea of the type of building to be erected; a period of disagreement and frustration followed, and then suddenly the building had to be finished in a rush.

When he (Mr. Jordan) first joined the Architectural Association he had had a vague idea that he might some day design a country house for a gentleman. This he now knew was unlikely to happen. The patron had changed and so had the scale of work, and today we thought of the patron as a local authority or an organisation. The scale having increased, the complexity of the architectural problem was likely to increase. We were consequently interested in the creation of the architectural team.

MR. ROLAND PENROSE said the members of the Institute believed there was a growing need for such a body, and wanted a place where the arts could be under one roof; where artists of all kinds could meet the public, show their works and have them criticised. The building was to be a workshop as much as a meeting place. The judges of the work in the exhibition had been impressed by the care, ingenuity and patience put into designing the buildings; it was encouraging that young architects had taken the matter so seriously.

Square Designs.

Offering some criticism of designs in the exhibition, he said that there was a tendency to give everything a very square form. Apparently the curve was less easily incorporated into a functional design. Another point was that there was scarcely an example of an entrance which welcomed you; usually the entrance was one opening among a lot of others. In the part of the building intended as a hall for exhibitions, the question of lighting had not been thoroughly considered. As a rule these designs were for halls lighted only from the top. An exhibition hall should always feature sidelighting as well. In one case there had been an ingenious method of preventing the direct light of the sun falling on the works exhibited. In this case there was a flat roof surmounted by a number of tubes like chimney pots through which light entered. Another method of excluding direct sunlight had been the provision of louvres which could be opened or closed.

The problem of artificial lighting was a highly specialised one, and it had not been attempted very seriously. A neglected feature was the staircase. Up to the first floor, at any rate, the staircase could be useful when dealing with numbers of people. It might be a feature in which curves mingled with straight lines to give a sense of functionalism as well as visual pleasure. The cloakroom side of the building had not, he said, been properly thought out; in very few cases had adequate provision been made for people coming in with wet clothes and umbrellas.

MR. HERBERT READ said they wanted their building to be a place where a mutual stimulus would take place among practising artists. How far that could be illustrated in a plan he was not sure. The kind of institute they had in mind did not exist today anywhere. It had to grow organically and might possibly begin in a group of army huts rather than in a beautiful building designed by a qualified architect.

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SOUTH-EASTERN SOCIETY OF ARCHITECTS

The Annual Luncheon

THE significance of the remarks in the reports of the Working Party and the Productivity Team on the importance of private enterprise in the building industry, was pointed out by MR. MICHAEL T. WATERHOUSE, P.R.I.B.A., when he spoke at the annual luncheon of the South-Eastern Society of Architects held at the Royal Star Hotel, Maidstone, on May 6.

Mr. Waterhouse, who was responding to the toast of "The Royal Institute of British Architects and its allied Societies," declared that many hard things had been said about British architects in connection with pre-planning as practised in the U.S. He believed that if our architects could adopt a method which combined the best features of the British system of bills of quantities with the American system of pre-planning, they would be about a hundred years ahead of the U.S.

Speaking of incentives for American building operatives, Mr. Waterhouse said that members of the British team which crossed the Atlantic recently found that the Americans worked hard not because they feared unemployment but because they were proud to belong to the aristocracy of the artisans in their country. Pride was their incentive.

Adding to comments made by MR. ARTHUR J. STEDMAN, F.R.I.B.A., president of the South-Eastern Society of Architects, who had proposed the toast, Mr. Waterhouse praised the work of the various architects' societies and went on to refer to the amount of pressure which it was necessary for the R.I.B.A. and other interests to apply to secure the latest alteration in the housing ratio.

The point about pride as an incentive was taken up by MR. ALFRED C. BOSSOM, M.P., F.R.I.B.A., who proposed the toast of "The Guests." He said that the greatness of the British building industry was not properly recognised, but pride was not likely to act as an incentive while there were so many restrictions in the industry.

Of the Architects' Registration Act, Mr. Bossom said he thought it would prove to be a great benefit to the profession.

Sympathy for young architects who often felt frustrated because their ideas got no further than the drawing board, was expressed by MAJOR C. E. PYM, C.B.E., chairman of Kent County Council, who responded to Mr. Bossom's toast. He said the largest volume of building work in progress at the moment in Kent consisted of council dwellings and new schools. Of the former he said they appeared to be submerging the old villages and were inclined to be monotonous to the eye, although inside they were very satisfactory. Of the latter he said they had plenty of daylight but were rather reminiscent of factory buildings.

Major Pym declared that most new housing estates lacked the pleasant decoration afforded by trees and he suggested that young trees should be planted now so that in a few years time the estates would look less bare.

Another response to the same toast was made by the Bishop of Croydon who maintained that architects and the clergy had a duty to work together. Buildings, he said, reflected the spirit of the age and the church was working to improve that spirit. How people influenced architecture was best exemplified in Germany before the last war where the buildings were pompous, materialistic and suggestive of Nazism. Modern architecture did not suggest that the present age was decadent or dead; it marked a new beginning and, if the world remained at peace, had great potentialities.

A telegram expressing apology for his absence was received from Sir Hartley Shawcross, K.C., M.P.

I.C.W.

Examinations, 1950.

THE EXAMINATION for Clerks of Works was held by The Institute of Clerks of Works of Great Britain Incorporated, at the Royal Institute of British Architects in April last. Successful candidates are:

PART I (PRELIMINARY)

(In Order of Merit.)

Wheeler, J. P., Birstall; Willey, G. R., W. Molesey; Webley, A. C., Twickenham; Duly, R. W., Arnold; Goodhand, H. D., Leicester; Townsley, A. R., Sheffield, 7; Wakeham, G. L., Yeovil; Philpott, D. H., Chatham; Moore, D. W., Leicester; Pollard, R., Worksop; Bailey, R., Taunton; Day, C., Gillingham; Clarke, C. J., Bedford; Watson, H., Wortley; Wilkinson, J., Bulford Camp; Amos, J. E., Fulham; Kirk, H. V., Catford, and Harding, W. C., S. Molton (equal); Overend, G., Chatham; Mapley, F. G., Watford, and Boulton, A. J., Harrogate (equal); Davies, A. W., Gillingham; Hutchin, I. E., Portsmouth; Stanley, D., Eye; Hocknell, G., Chatham, and Baker, R. Ripley, Derbyshire (equal); Jones, J. E., Chatham.

PART II (FINAL)

(In Order of Merit.)

Evans, R., Seven Kings; Parker, W., Lancaster; Watts, L. C., Chartham; Pearson, E., Hyde; Spirit, J. R., Ferry Hill; Browning, R. C., Stamford; Reilly, D. B., Edinburgh, 13; Pucci, V., Angus; Lee, F. B., Ferry Hill; Bowering, A., Bournemouth; Rispin, G. H., Hull; Lee, R. R., Weymouth; Gorton, S. W., Burton-on-Trent and Conelly, F., Halifax (equal); Hellewell, A., Bradford; Mellor, T., Stanmore; Edwards, W. R., Waterbeach; Martland, C. T., East Saltney.

The following passed in three groups in September, 1949, and this time completed the examination (alphabetical order):

Brown, J. G., Chatham; Brown, V. T., Small Heath; Davis, R. J., Weymouth; Hames, J. E., Leicester; Harding, H. R., Cheam; Jess, A. B., Shepperton; Loveridge, A. H., Worcester.

The following passed in two groups in September, 1949, and this time completed the examination (alphabetical order):

Howell, G. P., Chailey; Joliffe, W. C., Weymouth; Moorse, F. R., North Cheriton; Rigby, H. S., Preston; Smith, J., Bradford.

THE INSTITUTE OF BUILDERS

EXAMINATIONS

The next Examinations for the Institute's Diplomas will be held as follows:—

Licentiate Diploma Examination.

September 4th, 5th and 6th, 1950.

Associate Diploma Examination.

September 4th, 5th, 6th, 7th and 8th, 1950.

Latest date for sending in applications:—June 30th, 1950.

Syllabuses and Entry Forms will be forwarded free upon application to:—

The Secretary,
The Institute of Builders,
48 Bedford Square,
London, W.C.1

from whom also may be obtained past examination papers with drawings at 10s. a set for either examination.

HOUSING REPORTS FOR MARCH

THE Housing Progress Reports presented to Parliament on May 3 by the Minister of Health and the Secretary of State for Scotland show that the number of permanent houses completed in Great Britain during March was 19,385, compared with 14,069 in February and 14,356 in January. The total number of houses completed since April 1, 1945, is now 828,303 (671,157 permanent and 157,146 temporary).

During March, homes were provided by new building, repair of uninhabitable houses and conversion for 20,745 families, compared with 15,418 in February and 15,887 in January. This brings the total number of families rehoused by these methods under the post-war programme to 1,102,935. This total does not include homes provided in service camps or requisitioned properties.

Housing in Scotland.

THE number of new permanent houses completed in Scotland during March was 2,393, compared with 2,369 in the corresponding month last year. Altogether 103,470 houses (including 32,170 temporaries) have now been built in Scotland under the post-war housing programme. These figures are contained in the Department of Health for Scotland's quarterly housing return published on May 3.

The return shows that during the first quarter of this year 6,208 new permanent houses were completed. Other accommodation made available by conversions, adaptations, etc., bring the total number of homes provided during that period to 6,289.

March's total of 2,393 new permanent houses includes 2,299 built by local authorities, 48 by private enterprise and 46 by Government departments. Houses under construction at the end of March totalled 29,787.

Change of Address.

The Board of Trade Timber Control announces that from May 8 headquarters were removed from Cadogan-square to Lacon House, Theobalds-road, London, W.C.1. Tel: Chancery 4411.

Stolen Lead.

The police authorities ask us to make known the fact that a considerable quantity of coil and sheet lead, two boxes of brass bib taps, bath taps, traps and unions, and some lead chimney gutters and aprons were recently stolen from the premises of Messrs. P. J. Preston, builders, of Finchley. Builders and contractors are requested to report to the nearest police station any attempt made by persons other than those of recognised standing to effect sales of the abovementioned commodities.

Imported Cement for Scotland.

The Ministry of Works announced on May 8 that arrangements are being made with the Cement Makers' Federation for the import of substantial quantities of cement and cement clinker. The first shipments are expected in the near future and will be marketed in Scotland and Northern Ireland by the Cement Marketing Company at the same price as British cement. The clinker will be used by the Clyde Portland Cement Company and the Caledonian Portland Cement Company in the manufacture of their cements. All these companies will ensure that cements comply with British standards. This arrangement will release for other areas cement now shipped from the Thames to Scotland.

AMERICAN HOUSING

The " Slum Rehabilitation " Campaign

THE housing problem in the United States is acute, probably even more so than in this country. In his book on *American Building*, published in this country last year, Mr. James Marston Fitch, the distinguished American architect and editor, wrote: " That sector euphemistically known as the housing industry . . . has failed totally to meet its responsibilities. This failure is not a recent phenomenon; on the contrary, its roots go far back in American history. Evidence of its cumulative deficit begins to appear almost exactly with the urbanisation of the latter half of the nineteenth century. At its highest peak of production in 1929, the housing sector produced only some 900,000 new units; it has never approached that point since; in 1946, with a need of perhaps as many as 5,750,000 dwelling units, it produced a scant 500,000 units. And these left much to be desired in both quality and price."

The combined efforts of private enterprise and the Federal Housing Authority have failed signally to meet the need for working-class housing, and it is not surprising, therefore, to learn of the " Slum Rehabilitation Through Enforcement " campaign which is now being waged in the United States. The lead appears to have been taken by the City of Baltimore, where, since 1941, approximately 11,000 dwellings have been dealt with. Work is currently proceeding there at the rate of about 1,500 units per year. The programme is administered by the Office of Housing and Law Enforcement of the City Health Department, which employs 17 inspectors and operates on an annual budget of $62,000, which includes the cost of " rooming house " inspection. This expenditure represents a yearly cost to the city of about six cents for each resident. The Director, Mr. G. Yates Cook, has an advisory committee of 14 citizens, who work closely with him.

The Baltimore Housing Code.

The cost of bringing " run-down " dwellings up to minimum standards of accommodation and equipment is borne by the owners of the properties concerned. " This," it is stated in a brochure on the subject produced by the Urban Land Institute for the National Association of Real Estate Boards, " raises the question of ability to pay and the effects on rents. In Baltimore the average cost of rehabilitating the 11,000 units included in the programme has been between $300 and $500 each. The Federal Housing Administration under Title 1, Class 2 (National Housing Act) has authority to insure loans, specifically designed for this type of repair, to property owners. However, there is a need for developing more co-operation among the lending institutions in accepting loans of this type. An organised programme of rehabilitation, backed by business and civic groups with wide public interest, tends to give financing organisations confidence in loans needed to carry out the programme. Rent control boards permit rent increases on presentation of evidence that repairs have been made. In Baltimore the board accepts the certification of the Health Department. Rental increases have averaged approximately $1 per week per unit after rehabilitation has occurred."

From the Baltimore Housing Code we take the following " Rules and Regulations Governing the Hygiene of Housing," which are of interest as showing the minimum standards which have to be observed in the rehabilitation of slum property.

REGULATION 1. DEFINITIONS. When used in these regulations, the term " dwelling " means any house or building or portion thereof which is occupied in whole or in part as a home, residence or sleeping place of one or more human beings, either permanently or transiently; the term " dwelling unit " means a room or group of rooms intended to be occupied by one family or household as their home and where they sleep; and the term " habitable room " means a room which is designed or may be used for living, sleeping, eating or cooking. Storerooms, bathrooms, toilets, closets, halls or spaces in attics or in basements are not habitable rooms except as permitted in Regulation 6 in this series, entitled " Basement dwelling units."

REGULATION 2. BASEMENT OR CELLARS. The basement or cellar of any dwelling shall be dry and ventilated and shall be kept free from rubbish accumulation and rodent infestation.

REGULATION 3. HEATING. Every dwelling and every dwelling unit shall be weather-proof and capable of being adequately heated, and the heating equipment in every dwelling or dwelling unit shall be maintained in good order and repair.

REGULATION 4. DAMPNESS. The floors and walls of every dwelling and every dwelling unit shall be kept free from dampness.

REGULATION 5. LIGHTING AND VENTILATION. Every habitable room in a dwelling or dwelling unit shall contain a window or windows, opening directly to the outside air, and the total area of such window or windows shall not be less than 10 per cent. of the floor area of such room. All window sashes shall be glazed and provided with suitable hardware, and shall be made to open to the extent of not less than 5 per cent. of the floor area of such room.

REGULATION 6. BASEMENT DWELLING UNITS. No room in any basement or cellar shall be occupied as a habitable room unless:

1. The clear inner height is at least 7 ft. 6 in., and
2. The uppermost 3 ft. of the required clear inner height is above the average outside ground level, and
3. The floors and walls are water- and damp-proof in accordance with an approved method, if in contact with earth. Such water-proofing shall be between the floor or wall finish and the ground.

REGULATION 7. SLEEPING ROOMS. No room shall be used for sleeping purposes unless there are at least four hundred (400) cu. ft. of air space and 50 sq. ft. of floor space for each adult and at least two hundred (200) cu. ft. of air space and 30 sq. ft. of floor space for each child under the age of 12 years occupying such room. No room used for sleeping purposes shall have a floor area of less than 60 sq. ft.

REGULATION 8. Overcrowding. The occupancy of any dwelling unit having more than one habitable room shall not exceed an average of one and one-half persons per habitable room. For the purpose of this regulation any child under one year of age shall not be counted and any child more than one year old but under 12 years of age shall be deemed to be one-half person.

REGULATION 9. WATER SUPPLIES AND SINK In every dwelling unit containing two or more rooms there shall be running water and at least one sink connected to the public sewer or to an approved sewage disposal system.

REGULATION 10. COOKING OF FOOD PROHIBITED IN SLEEPING ROOMS. Where more than two persons occupy any dwelling unit food shall not be prepared or cooked in any room used for sleeping purposes.

REGULATION 11. TOILET FACILITIES. There shall be at least one water closet for each ten (10) persons or fraction thereof occupying a dwelling, which water closet shall be within and accessible from within the building.

REGULATION 12. PLUMBING. All plumbing, water closets and other plumbing fixtures in every dwelling or dwelling unit shall be maintained in good order and repair and in accordance with the requirements of the city plumbing code and regulations.

REGULATION 13. LIGHTING AND VENTILATION OF TOILETS AND BATHROOMS. Every toilet and every bathroom in a dwelling shall be provided with adequate light and ventilation.

REGULATION 14. GARBAGE, RUBBISH AND ASH RECEPTACLES. Every dwelling and every dwelling unit shall be provided with such receptacles to contain all garbage, rubbish and ashes as may be necessary, and all such receptacles shall at all times be maintained in good order and repair. Receptacles for garbage shall be made of metal, water-tight and provided with tight covers.

REGULATION 15. ENTRANCES. There shall be for each dwelling unit a separate access either to a hallway, landing, stairway or street.

REGULATION 16. DRAINAGE. All courts, yards or other areas on the premises of every dwelling shall be properly graded and drained.

Great efforts are now being made in the United States to popularise slum rehabilitation, the National Association of Home Builders and the National Association of Real Estate Boards being particularly active. The first-named body, among its activities, has produced a sound slide film entitled " Slum Rehabilitation: The Baltimore Story," which can be rented for a small fee in most cities of the country. It is being brought to the notice of city officials, clubs, schools, religious groups and home builders. Literature on the subject is also being widely circulated.

It is not possible to judge this movement fairly without a good deal of further information. The brochure prepared by the Urban Land Institute includes a number of photographic illustrations of properties before and after reclamation but gives no plans, so it is impossible to say whether any improvement has been secured in the general standard of layout. In some instances it would appear that no attempt has been made to reduce housing density. Admittedly, the " after treatment " views show a great general improvement on the extremely dilapidated and squalid condition of the properties before they were taken in hand. Few of the buildings shown, however, appear to be of a character that justifies preservation, and one cannot help feeling that it would have been better to sweep all these slums away and redevelop the sites on modern lines. If the illustrations shown are to any large extent typical of American housing conditions in the big cities, then the problem there is much more serious than is generally realised in this country. These slum reclamation schemes must surely be no more than temporary palliatives. Nothing but a great programme of new building, resolutely implemented, can be expected to solve America's formidable problem.

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BOOKS RECEIVED

CANTERBURY. By William Townsend. (London: B. T. Batsford, Ltd.) Price 8s. 6d.

SPAIN. By Sacheverell Sitwell. (London: B. T. Batsford, Ltd.) Price 16s.

COPINGER AND SKONE JAMES ON THE LAW OF COPYRIGHT. Eighth Edition. By F. E. Skone James. (London: Sweet and Maxwell, Ltd.) Price £3 3s.

NATIONAL INSURANCE (INDUSTRIAL INJURIES). Second Edition. By D. Potter and D. H. Stanfeld. (London: Butterworth and Co. (Publishers), Ltd.) Price 22s., post free.

"CLIENT MISLED BY SURVEYOR"

Judgment for Property Owner

HOLDING that the defendant had been completely misled by the fact that a surveyor, who was also a director of the building company that did the work, was acting in a dual capacity, Judge Alun Pugh, at Bow County Court, on Monday, gave judgment for Miss Adelaide Harriet Smith, property owner, of 39, Sussex-street, Plaistow, against Mason and Selby, chartered surveyors, of 36, Camomile-street, E.C.3, who had claimed £40 17s. 7d., the balance of professional fees in connection with war damage work carried out at defendant's address.

Mr. Albert Donald Mason, a member of the Royal Institution of Chartered Surveyors for 13 years, said he called on Miss Smith in July, 1948, and, after seeing the work which had to be done, told her it would be necessary to have a surveyor's specification and the chances of recovering money from the War Damage Commission would be better if she employed a surveyor. He told her he was a surveyor and she told him to proceed as a surveyor.

Cross-examined, Mr. Mason admitted he was one of the two directors of A. G. Mason, Ltd., builders, of Barking-road, E., who did the war damage repairs. His father, the other director, had retired. He considered he was right in acting as he did. He had done so before and it had not been considered improper.

Miss Smith, in evidence, said she went to the premises of A. G. Mason, Ltd., and gave the order to Mr. Mason, snr., for the work. He said he would send someone round. Later Mr. Mason, jnr., called with another man, who did all the talking. Mr. Mason, jnr., did not tell her then that he was a surveyor, and it was only gradually that she learned that he was. All the money she had received from the War Damage Commission, including surveyors' fees, had been paid over to A. G. Mason, Ltd.

For plaintiffs it was admitted that £13 10s. had been paid to the company, who thought it was for work done. Miss Smith still owed them money. There was no duty on Mr. Mason to get that money from the company. In addition to that £13 10s., Miss Smith was liable personally for surveyors' fees amounting to £27 7s.

Judge Pugh held that there was no contract with the plaintiffs, but only with the builders.

Referring to the dual capacity of Mr. Mason, jnr., the Judge said it was not a very good position for a professional man, for his interests might clash. No one imputed dishonesty to him. If the position was an improper one, he (the Judge) was sure the Institution of Chartered Surveyors would have something say about it, and therefore he was not going to criticise it. But it had led to some confusion in this case and had completely misled the defendant.

Dressed Granite Imports.

Recent trade discussions with Finland provided for the import from Finland in 1950 of "manufactured granite." Arrangements have now been made for the licensing of these imports. Applications for licences should be made to the Import Licensing Department of the Board of Trade, by May 31.

Change of Address.

From May 12, the London office of Wilson Lovatt and Sons, Ltd., civil engineering and building contractors, will be transferred to 16, Grosvenor-crescent, London, S.W.1. Tel: Sloane 0365.

DO WE "SEE" OUR SURROUNDINGS?

Mr. Hugh Casson's Talk

THE opportunity which the Festival of Britain offered to organisations of various kinds to make small but useful contributions to their visual surroundings, was stressed by MR. HUGH CASSON, F.R.I.B.A., Director of Architecture to the Festival, at the annual meeting of the Roads Beautifying Association, held on May 3.

As a nation, said Mr. Casson, we had lost the use of our eyes; we were going about in blinkers. The fact was, however, that we were surrounded by all kinds of offensive, ugly, trivial and vulgar things. It was as if the duck pond, so to speak, was full of rubbish and needed to be cleaned out.

The difficulty was not to be found in the actual carrying out of the necessary work, but rather in the initial realisation of what needed doing. In our blindness we were inclined not to notice the untidy condition of the duck pond because it was not our own direct responsibility.

The speaker said that there appeared to him to be two distinctly different attitudes towards the Festival. One was to regard it as a kind of half-holiday, an official jaunt which had been laid on and which we were being ordered to enjoy. The other—and in his opinion a better one—was to think of it as an occasion for infusing a new spirit into our activities in order to help make it a period of achievement.

It should be remembered also, he said, that during the Festival, Britain would be acting as host to her own countrymen as well as to overseas visitors. Facilities would be offered, in Battersea Park, for example, which were not normally available, and he felt that there was no doubt that full use would be made of them despite the widely held view that English weather made things impracticable.

Referring to the time factor, Mr. Casson said that the period left before the Festival was due to open was getting very short and he urged those who were still considering making a contribution towards the Festival to begin immediately to make their preparations.

Earlier in the meeting a report presented by the secretary concerning advisory work carried out by the association since 1947 showed that authorities from almost all parts of the country had taken advantage of the R.B.A.'s advisory service on such matters as the planning of county roads, landscape planning in relation to housing schemes, tree preservation, and tree planting.

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THE APPROACH TO INCENTIVES

Working Party Report Criticised

IS the building industry too narrow in its approach to the question of incentives? MR. D. E. WOODBINE PARISH, junior vice-president of the L.M.B.A., thinks it is, and he said so at a meeting of the North-Eastern Area at Snaresbrook last week. He also thinks that this criticism applies to the Working Party. Mr. Woodbine Parish said: "The Working Party Report on Building devotes considerable attention to the vital need for incentives in the industry, but appears to have placed a narrow and restrictive interpretation upon the meaning of the word. It refers to the progress made during the initial experimental period of two and a half years in connection with monetary incentives, but, like the industry itself, pays little regard to developing other, and probably more important, incentives which prompt an individual to produce his maximum output.

"Among such forms of incentive must be included interest, enjoyment, pride and satisfaction from work and mutual trust, which provide the optimum conditions for industrial wellbeing.

"These incentives, and many others, become apparent when objective thought is devoted to trying to ascertain what makes the wheels of industry turn, when the problem of man in relation to his fellow men is examined against an ever-changing social background, and study is given to the cause and effect of human behaviour. Unlike most other industries the building industry is not, and cannot be, highly mechanised. It is predominantly a craft industry and as a result the human factor is of paramount importance. Unfortunately, this fact is not always realised.

"When a mechanical failure occurs in a piece of plant or equipment a careful check is made and everything is done to ensure that there will be no repetition of the breakdown. How much more important it is that by similar means the constant wellbeing of the human element in industry is assured.

"The more this fundamental human problem is understood by the industry," concluded Mr. Woodbine Parish, "the sooner will the nation be able to sustain, and then improve, the standards of life which it at present enjoys."

Canadian Contract for Escalators.

Messrs. J. and E. Hall, of Dartford, Kent, inform us that they supplied the escalators being installed at St. Joseph's Oratory, Montreal, and in the New Ocean Terminal Buildings, Southampton.

THE SCOTTISH BUILDER

NEW BUILDINGS

Formouth.—Lanarkshire C.C. to erect two blocks of houses at the housing site, for which the architect is Samuel MacColl, County-chbrs., Beckford-st., Hamilton.

Glasgow.—Plans approved for the new Church of Scotland suite of halls to be erected at Abbeyhill-av. and Carntynehall-rd., off Shettleston-rd., Shettleston, for the Church of Scotland Authorities, 121, George-st., Edinburgh.

Glasgow.—Plans in hand for a scheme of additions at £12,000 for the Third Lanark Football Club, for which the architects are Forbes Campbell & Partners, 309, West George-st., Blythswood-sq., Glasgow, W.C.2.

Glasgow.—Plans prepared by Scottish Gas Board, 9, Randolph-cres., West End, Edinburgh, boiler-house, etc., estimated at £16,700, which it is intended to erect at Govan, Helen-st., have been approved by the Dean and Guild Court

Greenock.—From plans by their own architects and engineers, the Westburn Sugar Refineries, Ltd., Drumfrochar-rd., are to erect large additions to their refinery at Lyndoch-st.

FUTURE CONSTRUCTION

PUBLIC APPOINTMENTS

Full details of Public Appointments open will be found in the Advertisement pages of this and previous issues.

CONTRACTS OPEN

For some contracts still open but not included in this list see previous issues. Those with an asterisk are advertised in this number. The dates at the heads of paragraphs are those for the submission of tenders; a dagger (†) denotes closing date for applications; the name and address at the end refer to the person from whom particulars may be obtained.

BUILDING

MAY 15.

†***Bristol T.C.**—114 houses at Oldbury Court, Fishponds. City A. Dep. £2 2s. Tenders by June 2.

MAY 18.

†***Worcs. C.C.**—Stage II of New County Modern School, Poolbrook, Malvern. L. C. Lomas (F.), County A., 60, The Tything, Worcester.

MAY 19.

†**Birmingham T.C.**—40 maisonettes on three sites. H. J. Manzoni, City E. & S. Dep. £2 2s. each.

†***Bristol C.B.**—Erection of primary school at Henbury. J. Nelson Meredith (F.), City A., Eagle House. Dep. £2 2s.

†***Bristol T.C.**—New suspended floor at Zoology Room at the Museum and Art Gallery to provide office accommodation and children's lecture room. City A. Dep. £2 2s.

***Essex C.C.**—Adaptation of Mercury Press building, Goldlay-gdns., Chelmsford, for proposed County Library Headquarters. H. Conolly, F., County A., Chelmsford.

†***West Ham C.B.**—Rebuilding 44 flats, Manor-rd. housing site, E.15. T. E. North, F., Boro' A., 70, West Ham-la., E.15. Dep. £2 2s.

MAY 20.

Bakewell (Derby) R.D.C.—Erection of 10 houses in stone at Eyam. A. Lowcock, architect, King-st., Bakewell. Dep. £2 2s.

†***Essex C.C.**—Cloakroom block, etc., Rochford Junior school. H. Conolly, F., County A., Chelmsford.

†***Peterborough City.**—14 shops, 16 flats and branch Library, Central-ave., Dogsthorpe Newark estate. F. J. Smith, City E. & S. Dep. £2 2s. Tenders by June 10.

†***Tintwistle R.D.C.**—20 stone-faced houses at West-dr. M. Osbaldeston, C., Knarrside, Tintwistle, Hadfield. Dep. £2 2s.

†***Wellington (Salop) R.D.C.**—Pair of houses and 2 shops at Overdale estate, Ketley. Walter B. Bond, quantity surveyor, Colmore-chbrs., 3, Newhall-st., Birmingham, 3. Dep. £2 2s.

MAY 22.

†***Cambridge T.C.**—40 houses, Ditton-la. site. B.E. & S. Dep. £5 5s.

†***Croydon C.B.**—48 flats and 8 houses, Haling Down estate. B.E.

†***Derby C.B.**—110 houses at Mackworth estate. Thos. W. East (F.), Boro' A., Council House. Dep. £2 2s. Tenders by June 26.

***Finchley B.C.**—Decorations, minor alterations and repairs at various schools. B.E. & S. Dep. £2.

†***Ipswich C.B.**—Erection of Castle Hill Primary school. T.C., Town Hall. Dep. £2 2s. Tenders by June 11.

†**Lancaster T.C.**—Erection of 4 s.d. houses at Westfield memorial. Thomas H. Mawson & Son, architects, 84, Church-st., Lancaster. Tenders by June 12.

Newquay (Corn) U.D.C.—Erection of 8 bungalows on Mayfield estate. E. & S., Council Chambers, Beach-rd., Newquay. Dep. £2 2s.

MAY 24.

***Essex C.C.**—Two new primary schools, one at Dagenham and one at Debden. H. Conolly, F., County A., Chelmsford.

MAY 25.

***Dewsbury C.B.** — Sub-structure for new secondary modern school, Bank Top. Boro' A. & Building S. Dep. £3.

†***Worthing T.C.**—Public conveniences and alterations to sub-structure of Old Town Hall. B.E. & S. Dep. £2 2s.

MAY 26.

†***Eastbourne C.B.**—Conversion of Trevin Towers, Gandick-rd., into home for aged persons. S. G. Scales, A., National Provincial Bank-chbrs., Terminus-rd. Dep. £2 2s.

†***West Sussex C.C.**—Canteen kitchen and dining-room at Rusper school, near Horsham. County A., Chichester.

MAY 27.

†**Basingstoke R.D.C.**—18 houses and four bungalows on housing site at East Oakley. Wallis & Smith, A.R.I.B.A., chartered architects, 6a, London-st., Basingstoke. Dep. £3 3s.

†***North Riding Standing Joint Committee.**—16 police houses at seven sites. County A., County Hall, Northallerton. Dep. £2 2s. Tenders by June 19.

†***Southampton C.B.**—Erection of junior school at Wimpson. Boro' A., Civic Centre. Dep. £2 2s. Tenders by June 26.

Wimborne and Cranborne (Dorset) R.D.C.—Erection of 3 pairs of houses and 2 pairs of bungalows at Colehill. Crickmay & Sons, architects, 7, Church-street, Wimborne. Dep. £2 2s.

MAY 30.

***Barnes T.C.**—Reconstruction of roof at refuse destructor, Townmeade-rd., Mortlake. B.E. & S. Dep. £1.

***Chelmsford T.C.**—Seven shops with eight flats over at Woodhall estate. B.E., Municipal Offices. Dep. £2 2s.

MAY 31.

†***Cheshire C.C.**—Seven new primary schools. E. Mainwaring Parkes, F., County Architect, Chester. Dep. £2 2s. Tenders by July 14.

***Chesterfield T.C.**—80 houses, Newbold estate. B.E. & S. Dep. £2 2s.

***Dartford B.C.**—76 dwellings at Temple Hill neighbourhood unit. T.C., High-st. Dep. £2 2s.

***Ilford T.C.**—Two additional classrooms at Atherton-rd. B.E., Town Hall. Dep. £2 2s.

Southend-on-Sea C.B.—Construction of two r.c. aprons to a Bellman hangar at municipal airport. R. G. Baxter, E. & S. Dep. £2.

***Weymouth and Melcombe Regis T.C.**—8 houses, Littlemoor-rd. estate. B.E. & S., 6, Pulteney-bldgs. Dep. £2 2s.

JUNE 1.

***Chertsey U.D.C.**—Demolition and rebuilding of brick gatehouse at Alexandra-rd., Addlestone. E. & S. Dep. £1 1s.

***Leyton T.C.**—Rebuilding glazed brick wall to two swimming baths. B.E. & S.

JUNE 2.

***Carlisle T.C.**—School for 360 pupils. City E., 18, Fisher-st. Dep. £2 2s.

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MAY 31.

***Rowley Regis T.C.**—Conversion of underground air-raid shelter into public conveniences with pedestrian subway at Market-pl., Blackbeach. B.E. & S., Municipal-bldgs. Dep. £2 2s.

JUNE 6.

***Sevenoaks R.D.C.**—18 houses at Coles-la., Brasted. E. & S., "Inglewood," Oak Hill-rd. Dep. £2 2s.

JUNE 7.

***Finchley B.C.**—Convenience at Glebe Land, North Circular-rd. B.E. & S., 294-296, Regent's Park-rd. Dep. £1.

JUNE 12.

***Chelmsford R.D.C.**—32 houses with road works, etc., at Writtle. Estates Manager (Room 26), R.D.C. Offices, New London-rd. Dep. £2.

***Windsor Royal Boro'.**—30 houses at Imperial-rd. B.E., Kipling Memorial-bldg. Dep. £2 2s.

JUNE 13.

***Walthamstow T.C.**—18 flats, Stoneydown, Blackhorse-rd., E.17, and 18 flats in Montalt-rd., and 4 houses, Howard-rd. Boro' A. Dep. £2 2s.

JUNE 15.

***Reading C.B.**—Conversion of "Dysons Wood," Kidmore End, into a children's nursery. Boro' A. Dep. £2 2s.

PAINTING, ELECTRIC LIGHTING, MATERIALS, ETC.

MAY 15.

†**Gloucester T.C.**—Heating and hot water installations at Coney Hill Junior School. A. Morgan, L.R.I.B.A., City A., Suffolk House, Greyfriars, Gloucester.

MAY 19.

Breconshire C.C.—New electrical installations at four schools at Brecon, Ystradgynlais and nr. Brynmawr. H. C. W. Strickland, County A., Rhyd Offices, Brecon. Dep. £3 3s. per school.

†***Mitcham B.C.**—Installation of domestic heating in 61 houses at Edmund-rd. and London-rd. B.E. & S.

MAY 24.

†***Northants C.C.**—(a) Heating and domestic hot water installations; and/or (b) electrical installations at three schools. C., County Hall, Northampton.

MAY 26.

***Southampton C.B.**—Redecoration of Portswood Secondary Modern School. Boro' A. Dep. £1 1s.

MAY 27.

***Widnes E.C.**—Painting 6 schools. T. A. Brittain, A., Boro' A., Brendan House, Widnes-rd.

JUNE 5.

***Chertsey U.D.C.**—External painting to 46 houses at New Ham. E. & S.

JUNE 9.

***Cheshunt U.D.C.**—Repairs, painting, etc., on various sites. E. & S., Manor House. Dep. £2 each contract.

ROADS, SEWERAGE AND WATER WORKS

MAY 23.

Swadlincote U.D.C.—Surface dressing of approx. 36,000 sq. yds. of carriageway within the urban district. E. & S., Bank House, Midland-rd., Swadlincote. Dep. £1.

MAY 27.

***Merthyr Tydfil C.B.**—Advance preparation of site at Swansea-rd. B. & Waterworks E., Town Hall. Dep. £3 3s.

MAY 31.

***Ilford B.C.**—Laying of subsoil drain, etc., at Barkingside Cemetery. B.E. Dep. £2 2s.

Kettering B.C.—Advance preparation work at Grange estate. J. Patrick Haugh, F.R.I.C.S., E. & S., 3, Gold-st., Kettering. Dep. £3 3s.

JUNE 6.

***Sevenoaks R.D.C.**—Roads and sewers at Coles-la., Brasted. E. & S. Dep. £2 2s.

GENERAL BUILDING WORK

(LONDON)

Battersea.—SCHOOL.—Sir John Burnet, Tait & Partners, FF. & A.R.I.B.A., 10, Bedford-sq., W.C.1, are architects for county school, proposed by L.C.C., for 320 juniors and 240 infants at Linda-st., Battersea. Est. cost, £101,296.

Fulham.—WAR DAMAGE REPAIRS.—Richard Nickson, F.R.I.B.A., 34, Welbeck-st., W.1, is the architect for war damage repairs and improvements at Beaufort House school, Fulham, to provide additional accommodation. Est. cost, £26,637.

Hackney.—SCHOOL.—L.C.C. have approved preliminary plans prepared by George Fairweather, F.R.I.B.A., 28-30, Wigmore-st., W.1, for county primary school for 320 boys and girls on the Kingsmead estate, Hackney. Est. cost, £60,319.

Islington.—WAR DAMAGE REPAIRS AND IMPROVEMENTS.—N. F. Cachemaille-Day, F.R.I.B.A., 1, Port Hill, Hertford, is the architect for war damage repairs and improvements at Yerbury-rd. school, Islington, to provide 320 additional primary school places. Est. cost £22,307.

Lower Sydenham.—ADDITIONS.—Hobday & Maynard, FF.R.I.B.A., 19, Beckenham-gr., Shortlands, Bromley, Kent, are architects for

conversion of former Government training centre in Worsley Bridge-rd., Lower Sydenham, to provide additional accommodation for South-East London Technical College. Est. cost. £13,032.

Poplar.—HOUSES AND FLATS.—G.P. committee have approved a revised scheme by council's architect's Dept. for 43 houses and 12 flats on site on the Isle of Dogs.

Southwark.—WAR DAMAGE REPAIRS.—E.C. of L.C.C. have approved preliminary plans for war damage repairs at Walworth county sec. school, Southwark. Architect is N. F. Cachemaille-Day, F.R.I.B.A., 1, Port Hill, Hertford. Est. cost, £7,847.

Stepney.—SCHOOL.—L.C.C. propose erection of a primary school for 120 infants at Gill-st., Stepney. Architects are Poulton & Freeman, FF.R.I.B.A., 96, Dorset House, Gloucester-pl., N.W.1. Est. cost, £29,977.

Wandsworth.—WAR DAMAGE REPAIRS AND IMPROVEMENTS.—L.C.C. Ed. comm. have approved preliminary plans, prepared by Booth & Ledeboer, F. & A.R.I.B.A., 14, Lincoln's Inn Fields, W.C.2, for war damage repairs and improvements at Woodmansterne-rd. school, Wandsworth. Est. cost, £29,905.

Westminster.—EXTENSION.—H. S. Goodhart-Ruedell & Partners, FF.R.I.B.A., 13, Crawford-st., W.1, have prepared a revised scheme for the completion of the extension to Westminster technical college, which provides for a dining-room for students, enlargement of existing restaurant, construction of a library, chemistry laboratory, five classrooms and a lecture room. Est. cost, £58,220.

Wimbledon.—HOUSING SCHEMES.—B.C. has instructed Mr. R. Mountford Pigott, M.C., F.R.I.B.A., 3, Cromwell-pl., South Kensington, S.W.7, Mr. J. J. Bevan, A.R.I.B.A., 23, Wimbledon Bridge, S.W.17, and Mr. J. Stewart-Thomson, F.R.I.B.A., 49, Hill-rd., S.W.19, to prepare plans, etc., for erection of housing accommodation on a number of vacant sites acquired by the council.

Wimbledon.—REDEVELOPMENT.—Mr. J. Stewart-Thomson, F.R.I.B.A., 49, Hill-rd., S.W.19, is to prepare layout plans, etc., for the redevelopment of sites Nos. 300-306 and 313, Haydons-rd. An off-licence is to be rebuilt at 308, Haydons-rd. for Meux's Brewery Co., Ltd., from designs by the same architect.

Wimbledon.—BRANCH POST OFFICE.—The M.O.W. has designated for acquisition the sites of 128-134, Broadway for a branch post office.

Wood Green.—EXTENSIONS AND ADDITIONS.—B. W. Turnbull & Partners, F/L.R.I.B.A., 48, Cannon-st., E.C.4, are architects for a ground-floor extension and a new shopfront at shop premises at 85, High-rd.

Wood Green.—OFFICES AND WORKSHOP.—Works, plans and parks committee have approved plan by Vine & Vine, AA.R.I.B.A., Tudor-chbrs., Station-rd., N.22, for an addition of offices and workshop to factory at Wellesley-rd. for William Stephen & Sons, Ltd.

Wood Green.—EXTENSIONS.—Julian Keyes, A.R.I.B.A., 10, Manchester-sq., W.1, has applied for consent to an extension at rear of shop premises at 18-20, High-rd.

TENDERS

* Denotes *accepted*.
† Denotes *provisionally accepted*.
‡ Denotes *recommended for acceptance*.
§ Denotes *accepted subject to modification*.
¶ Denotes *accepted by H.M. Government Departments*.

Andover.—Six houses at Silverbirch-rd., for T.C. B.S., "Beech Hurst," Weyhill-rd.:—
Whittaker, Ellis, Ltd., 58, Victoria-st., S.W.1 ... ... £13,699
Hadsphaltic Construction Co., Ltd., 721, Ibex House, Minories, E.C.3 13,687
Power Lines Construction Co., Ltd., 103, Sedlescombe-rd. North, St. Leonards-on-Sea, Sussex 13,683
Bridgewater Bros. (Public Works Contractors), Ltd., 97, East-st., Epsom ... 12,586
Belgravia Construction & General Contractors, Ltd., 133, Ebury-st., London, S.W.1 10,228
*Delaney & Brennan, Ltd., 48, Parkway, Camden Town, N.W.1 9,552

Atcham.—10 houses at Pontebury, for R.D.C.:
*W. Higley & Son, Pontesbury, £13,133.

Barnes.—16 flats at Ranelagh-gdns., Rocks-la., for T.C. B.E. & S., Municipal Offices, Sheen-la., S.W.14: *Arthur Watson, Ltd., Worton Court estate, Isleworth, Mddx., £22,434.

Barrow-in-Furness.—Six police houses at Undergreens, Hawcoat-la., for C.B. J. N. Flitcroft, A.M.I.C.E., M.I.Mun.E., B.E. & S., Town Hall: *The Building Manager, Corporation Building Department, Salthouse-rd., Barrow-in-Furness, £7,869.

Belvedere.—Erection of Baptist Church and School Hall at Nuxley-rd., Belvedere, Kent, for the London Baptist Property Board, Ltd., under the direction of Mr. F. Sutton-Smith, F.R.I.C.S., L.R.I.B.A., M.I.Struct.E., Midland Bank-chbrs., Wallington, Surrey: *Prefabricated Construction, Ltd., 11, Upper Grosvenor-st., London, W.1.

Beverley (Yorks).—Erection of four houses at Scorborough, for R.D.C. G. Palfreyman, E., S. & A., 36, Market-pl., Beverley: *A. K. Templeton, Ltd., 90, Marlborough-av., Hull.

Eastbourne.—Erection of (1) 12 flats, Bourne-st., and (2) five pairs large houses, section 18, Chatfield/Davis estate, Hampdon Park, for B.C. R. Williams, B.Sc., A.M.I.C.E., B.E. & S., 274, Saffrons-rd., Eastbourne. (1): *Mark Hookham, Ltd., Eastbourne, £18,144; (2): *J. G. Robinson & Sons, Ltd., Eastbourne, £19,739.

Edinburgh.—New buildings for Miller & Co., Ltd., London-rd. Foundry. R. S. Naismith (F.), architect, 44, Queen-st., Edinburgh: *R. Bruce & Sons, Ltd., Edinburgh.

Eton.—Seven shops with flats over at Meux Field site, Eton Wick, for U.D.C. Quantities by Eastman Partners, 21, The Grove, High-st., Slough, Bucks: *Messrs. Gilmore's, Parkland's estate, Langley, Bucks (subject to M.H. approval).

Eton.—16 houses at Tilston Field site, Eton Wick, for U.D.C. Burgess, Holden & Watson architects, Beaconsfield. Quantities by Eastman Partners, 21, The Grove, High-st., Slough: *Purser & Co. (Hillingdon), Ltd., 43, Uxbridge-rd., Hillingdon, Middx. (subject to M.H. approval).

Hampton.—Seven houses at Riverdale Lawn, for Metropolitan Water Board: *R. E. Spooner, Ltd., £18,968 (subject to M.H. approval).

Hendon.—(a) Underpinning and reconstruction at Edgware Secondary Modern School and Edgware Infants' School and Junior School; (b) alterations and reconditioning at Edgware Old School, for B.C. (a): *Roger Malcolm, Ltd., Church-la., Kingsbury, N.W.9, £1,544; (b): *Roger Malcolm, Ltd., Church-la., Kingsbury, N.W.9, £3,889.

Hexham.—18 houses with roads and sewers at Haydon Bridge, for R.D.C. Architects, W. Dixon & Sons, 1, Collingwood-st., Newcastle: *H. Kindred, 145, West-rd., Newcastle.

Lancaster.—Alterations and additions at Friends' School, Meeting House-la., for Trustees. Architects, Middleton & Jones, 1, Queen-st., Lancaster: *J. Parkinson & Sons, Ltd., Parliament-st., Lancaster, £7,772.

Lanchester.—Extensions to the Memorial Hall, Lanchester, Co. Durham: *J. Tully & Son, Hope-st., Blackhill, Co. Durham.

Liverpool.—Tenders approved by the Council: *Capstick & Owen, Ltd., Liverpool, £13,320, for nine houses; *John McGeoch & Sons, Ltd., Kirkby, Liverpool, £23,969, for construction of roads, pavings and sewers; *Tysons (Contractors), Ltd., Liverpool, £45,377, for 30 flats; *Tysons (Contractors), Ltd., Liverpool, £45,284, for another 30 flats; *J. L. Rawsthorne & Co., Ltd., £42,820, for 28 houses: *Unit Construction Co., Ltd., Liverpool, £218,115, for 132 houses; and *F. C. Bloomfield & Co., Ltd., Liverpool, £58,370, for 34 houses.

L.C.C.—Undermentioned contracts exceeding £2,500 in value placed by the L.C.C. during period ended May 3:—

Erection of blocks 1 and 2 of flats and other works at Hilldrop estate, Islington, Tersons', Ltd., 1, Seward-st., E.C.1; Cleaning and painting at Parkside School and Lyham-rd. Baths, Lambeth, Chas. H. Graff, Ltd.

Improvements to sanitary and washing accommodation at Sherbrooke-rd. School, Fulham, W. J. Marston & Son, Ltd.; Cleaning and painting at Pulteney School, Westminster, C. P. Roberts & Co., Ltd.; Erection of a primary school at Tulse Hill Housing estate, Lambeth, J. Garrett & Son, Ltd.; Erection of a new primary school at Brandlehow-rd., Wandsworth, H. T. Oliver & Sons, Ltd.

Provision of a sewage pumping station, rising main and water service pipe at Warnham Court, Horsham, Sussex, Hoad & Taylor, Ltd.; Cleaning and painting at Teesdale-st. School, Bethnal Green, Kind & Co. (Builders), Ltd.; Cleaning and painting at Whitmore School, Shoreditch, Whyatt (Builders), Ltd.; Cleaning and painting at Tottenham-rd. School, Hackney, Kind & Co. (Builders), Ltd.

L.C.C.—Construction of 59 flats in two blocks (Nos. 1 and 2), 30 perambulator sheds, a children's fitted playground and tenants' garden at Arden estate (Wilks-pl. site), Shoreditch:—

C. Miskin & Sons, Ltd., St. Albans ...	£109,746
J. Jarvis & Sons, Ltd., Westminster ...	106,842
Amalgamated Building Contractors, Ltd., Lambeth	104,986
Leslie & Co., Ltd., Kensington	104,539
Kent & Sussex Contractors, Ltd., Sidcup	104,164
Henry Boot & Sons, Ltd., Kensington	103,995
Harry Neal, Ltd., St. Marylebone ...	102,946
Foster & Dicksee, Ltd., St. Marylebone	102,826
Gee, Walker & Slater, Ltd., Westminster	102,455
Allen Fairhead & Sons, Ltd., Enfield ...	101,829
W. J. Simms, Sons & Cooke, Ltd., Westminster	100,657
A. T. Rowley (London), Ltd., Tottenham	99,380
Stewart & Partners, Ltd., St. Marylebone	98,811
*Rowley Bros., Ltd., Tottenham ...	97,961

Comparable estimate of director of housing and valuer is £97,738.

Construction in monolithic or reinforced concrete of blocks 26, 27 and 28, eight storeys in height, at Ocean estate, Stepney:—

A. E. Symes, Ltd., Stratford	£438,587	£436,487
Kent & Sussex Contractors, Ltd., Sidcup	435,339	433,104
W. J. Simms, Sons & Cooke, Ltd. Westminster	417,966	419,595
Holland & Hannen and Cubitts, Ltd., Westminster	401,122	403,953
Wates, Ltd., Norbury	394,700	399,071
*Tersons, Ltd., Finsbury ...	398,790	398,790

Estimated cost of erecting three blocks in steel-framed building of brick construction is £419,726.

Construction of superstructures of three four-storey blocks (Nos. 1, 2 and 3), containing 118 flats of the staircase access type, and other works at Tabard Garden estate extension No. 2 (Great Dover-st. sites), Southwark:—

W. H. Gaze & Sons, Ltd., Kingston-upon-Thames	£203,125
Prestige & Co., Ltd., Westminster ...	202,778
J. Chapman & Sons, Leicester ...	201,432
Leslie & Co., Ltd., Kensington ...	201,320
Speirs, Ltd., Westminster	200,084
The Bunting Construction Co., Ltd., Lambeth	199,970
C. F. Kearley, Ltd., Hammersmith ...	199,900

"THE BUILDER" PRICES

ZINC PRICES INCREASED

The Ministry of Supply announces that the price of good ordinary brand zinc has increased by £2 per ton to £99 10s. per ton, delivered, with effect from May 5. Prices of other grades have been increased accordingly.

The Zinc Oxide Manufacturers also announce that from the same date the prices of zinc oxides, in lots of not less than two tons, delivered buyers' premises, are increased by £1 15s. per ton, as follows:

	New Price. £ s. d.	*Old Price.* £ s. d.
Red Seal	94 10 0	92 15 0
Green Seal	96 0 0	94 5 0
White Seal	97 0 0	95 5 0

LEAD

Following the increase to £90 per ton in the Government-controlled price of lead as announced by the Ministry of Supply, the Associated Lead Manufacturers, Ltd., London, E.C.3, announce the following new basis prices of their lead products, effective from May 5.

	New basis price per ton £ s. d.
Genuine English Dry White Lead (Basis in 1 x 8 cwt. cask)	118 5 0
Genuine Ground English White Lead (Basis in 1 x 5 cwt. cask)	138 5 0
Genuine Refined English Red Lead (Basis in 1 x 5 cwt. cask)	108 15 0
Genuine English Powdered Litharge (Basis in 1 x 5 cwt. cask)	108 15 0
Genuine Refined English Red Lead Ground in Oil (Basis in 1 x 5 cwt. cask)	131 10 0
English Sheet Lead .. .. .. (Basis for 2-ton lots)	107 5 0
English Lead Pipe (Basis for 2-ton lots)	108 10 0
English Lead Shot (Basis for 1-ton lots)	118 10 0

C. Miskin & Sons, Ltd., St. Albans ...	199,701
Rowley Bros., Ltd., Tottenham ...	197,422
Stewart & Partners, Ltd., St. Marylebone	193,300
W. J. Simms, Sons & Cooke, Ltd., Westminster	191,474
*M. J. Gleeson, Ltd., Cheam	189,115

Comparable estimate of director of housing and valuer is £195,700.

Further extension of contract with W. & C. French, Ltd., on "value-cost" basis of 183 dwellings, six shops with maisonettes above and construction of foundations for first part of major shopping centre at Hainault estate.

Forty-two flats and maisonettes and children's fitted playground at Woodberry Down estate, Stoke Newington: *Kent & Sussex Contractors, Ltd.

Construction of blocks 1 and 3 and other works (contract A) and the construction of blocks 4, 6 and 7 and other works (contract B) on housing site 1 in Lansbury, Stepney-Poplar reconstruction area. Tenders were invited on the basis that the priced schedule quantities for contract A would be used to value the work in both contracts:—

J. Jarvis & Sons, Ltd., Westminster...	£87,764
Rowley Bros., Ltd., Tottenham	87,200
Halse & Sons, Ltd., Woolwich	86,575
A. T. Rowley (London), Ltd., Tottenham	85,627
Stewart & Partners, Ltd., St. Marylebone	84,869
Leslie & Company, Ltd., Kensington ...	84,700
W. J. Simms, Sons & Cooke, Ltd., Westminster	82,977
The Unit Construction Co., Ltd., Westminster	82,475
Thomas & Edge, Ltd., Woolwich ...	81,187
Gee, Walker & Slater, Ltd., Westminster	80,956
M. J. Gleeson, Ltd., Cheam	79,979
Kent & Sussex Contractors, Ltd., Westminster	79,934
Tersons, Ltd., Finsbury	75,689

Comparable estimate of director of housing and valuer is £74,947.

Development of Sheerwater site, Woking. Tenders on basis of a "value-cost" contract for the construction of all the roads and sewers and about 1,000 houses, flats and other buildings were invited:—

	Percentage increase or decrease in schedule prices Roads and sewers.	Houses etc.
Wates, Ltd., Norbury ...	+12½	+1½
Wilson, Lovatt & Sons, Ltd., Wolverhampton ...	+ 14	+1
Holland & Hannen and Cubitts, Ltd., Westminster	+ 10	− 1
John Mowlem & Co., Ltd., Westminster	− 2½	+1
W. & C. French, Ltd., Buckhurst Hill	+ 2½	− 1
Gee, Walker & Slater, Ltd., Westminster	+ 1½	− 1½
John Laing & Son, Ltd., Mill Hill	− 3	− 4½
Richard Costain, Ltd., Westminster	− 4½	− 5½
*Sir Lindsay Parkinson & Co., Ltd., Holborn ...	− 5½	− 6½

Additional accommodation for Lewisham day college:—

Stone & Co. (London), Ltd., Croydon...	£10,976
W. F. Marshall, Ltd., Buckhurst Hill...	10,815
Drury & Co., Ltd., Camberwell	10,651
A. J. Dunning & Sons, Woolwich ...	10,641
Herbert Richardson & Sons, Erith ...	10,605
Thomas & Edge, Ltd., Woolwich ...	10,497
J. & C. Bowyer, Ltd., Upper Norwood	10,459
Norman Wright (Builders), Ltd., Lambeth	10,458
Clarke, Barton & Co., Ltd., Sutton ...	10,377
H. T. Oliver & Sons, Ltd., Wandsworth	10,285
Whyatt (Builders), Ltd., Wandsworth...	10,257
Henry Kent (Builders), Ltd., Lewisham	10,214
Greenaway & Son, Ltd., Camberwell ...	10,185
Bridge Walker, Ltd., Lambeth	9,996
John Harrison (London), Ltd., Lambeth	9,995
*W. R. Oldham, Ltd., Beckenham ...	9,414

Architect's comparable estimate is £9,678.

Erection of county primary school in prefabricated construction at Brandlehow-rd., Wandsworth:—

J. Garrett & Son, Ltd., Wandsworth...	£38,725
Galbraith Bros., Ltd., Holborn	38,105
A. Roberts & Co., Ltd., Westminster ...	37,738
Kirk & Kirk, Ltd., Wandsworth ...	37,036
William Lacy (Hounslow), Ltd., Hounslow	36,879
G. T. Crouch, Ltd., Kingston-on-Thames	36,672
Sloggetts (Contractors), Ltd., Kensington	35,972
Richard Costain, Ltd., Westminster ...	35,801
Leslie & Co., Ltd., Kensington	35,313
John Morgan (London), Ltd., Westminster	34,883
W. J. Simms, Sons & Cooke, Ltd., Westminster	34,695
C. F. Kearley, Ltd., Hammersmith ...	34,688
*H. T. Oliver & Sons, Ltd., Lambeth ...	34,351

Comparable estimate of architect in private practice responsible for the work is £35,210.

Completion of Horn Park primary school:—

Halse & Sons, Ltd., Woolwich	£113,568
Rowley Bros., Ltd., Tottenham	112,450
Lavender & McMillan, Ltd., Worcester Park	112,220
J. Garrett & Son, Ltd., Wandsworth ...	111,934
J. & C. Bowyer, Ltd., Wimbledon ...	111,740
Amalgamated Building Contractors, Ltd., Wandsworth	111,635
Kent & Sussex Contractors, Ltd., Sidcup	111,276
Geo. Parker & Sons, Ltd., Camberwell	111,248
Prestige & Co., Ltd., Westminster ...	110,954
Fred & T. Thorne, Ltd., Lewisham ...	110,720
Tersons, Ltd., Finsbury	110,374
Thomas & Edge, Ltd., Woolwich ...	105,668
Thomas Tierney & Co., Ltd., Poplar...	104,294
*E. H. Smith (Croydon), Ltd., Croydon	100,915

Architect's comparable estimate, £103,928. Savings amounting to £15,363 can be effected on accepted tender.

War damage repairs and improvements at Medburn School, St. Pancras:—

F. R. Hipperson & Son, Ltd., E.C.2 ...	£19,714
Y. J. Lovell & Son, Ltd., Paddington ...	19,695
Frank Batty & Smith, Ltd., Paddington	19,673
Marshall Andrew & Co., Ltd., Westminster	19,624
Lavender, McMillan, Ltd., Worcester Park	19,548
J. Jarvis & Sons, Ltd., Westminster ...	19,457
Yeomans & Partners, Ltd., St. Marylebone	19,373
Patman & Fotheringham, Ltd., Islington	18,911
Sloggetts (Contractors), Ltd., Kensington	18,379
W. S. Barton & Co., Ltd., Holborn ...	17,811
W. J. Marston & Son, Ltd., Fulham ...	17,456
*H. T. Oliver & Sons, Ltd., Lambeth ...	16,111

Comparable estimate of architect in private practice is £16,237. Certain savings will reduce accepted tender to £15,039.

¶London (Admiralty).—Particulars of contracts.—Civil Engineer-in-Chief's Department, Admiralty:—

Culdrose: R.N. Air Station, site works, Staverton Builders, Ltd., Totnes, Devon.

¶London (Air Ministry).—Contracts to value of £500 or over for week ended May 6:—

Building work: G. H. Miller & Co., Ltd., Forest Gate, London, E.7. *General maintenance work*: Airwork, Ltd., Langley, Bucks; J. W. Whiffin & Sons, Ltd., Epping, Essex; Henry Kent (Builders), Ltd., Hithergreen, London, S.E.13.

¶London (M.O.W.).—Contracts placed by M.O.W. for week ended April 29:—

London: Kew Gardens, Repair to river bank, Holloway Bros. (London), Ltd., Bridge Wharf, 157, Millbank, S.W.1; Cornwall House, Stamford-st., Adaptations to 5th floor for Stationery Office, J. Garrett & Son, Ltd., Cathles-rd., Balham, S.W.12; Islington Cattle Market, Erection of changing room for slaughtermen, John Greenwood, Ltd., King William-st. House, Arthur-st., E.C.4.

Berkshire: Min. of Supply Storage Depot, Burghfield. Internal and external painting, Fields, Ltd., 248, King's-rd., Reading. *Buckinghamshire*: Latimer, Erection of 10 houses and dormitory block, Y. J. Lovell & Son, Ltd., Marsham-la., Gerrards Cross. *Cheshire*: The Firs, Chester, Erection of 12 houses, Tho. Warrington & Sons, Ltd., 82, Station-rd., Ellesmere Port.

Dorsetshire: Castleton-la., Sherborne, Erection of temporary classrooms, A. J. Stainer, Bristol-rd., Sherborne. *Leicestershire*: Wigston telephone exchange, Extension, J. Chapman & Sons, Ltd., Knighton Junction Works, Watford-rd., Leicester. *Warwickshire*: Block "J," Post Office Supplies Factory, Birmingham, Completion, George Wimpey & Co., Ltd., Hammersmith-gr., London, W.6. *Wiltshire*: Swindon, Erection of telephone repeater station, The Building & Public Construction Co., Headlands Factory, Swindon.

¶London (War Dept.).—Works contracts placed by War Dept. for week ended April 29:—

Morayshire: Site preparation work, John McAdam & Sons, Ltd., Aberdeen. *Co. Tyrone*: Building work, James Ross & Son (Contractors), Ltd., Belfast. *Ayrshire*: Miscellaneous work, John Moulds (Kilmarnock), Ltd., Kilmarnock.

Yorkshire: Building work, Ernest Hunter (Scarborough), Ltd., Scarborough. *Wilts*: Miscellaneous work, Downing, Rudman & Bent, Ltd., Chippenham. *Hants*: Miscellaneous work, R. E. Spooner, Ltd., Ashford. *Lancs*: Roofing work, Manchester Slate Co., Ltd., Manchester.

Manchester.—Extensions to Shirley Cotton Research Institute, Didsbury. Architects, H. S. Fairhurst & Sons, 55, Brown-st., Manchester: *J. Gerrard & Sons, Swinton, nr. Manchester.

Manchester.—Works for T.C. Adaptation of "Garswood," Didsbury and Moorbank, Fallowfield: *F. Marsland, Ltd., Stockport; additional classrooms at St. Dunstan's R.C. School, Moston: *Mr. G. Beswick, Stretford.

Houses at Woodhouse Park and Moss Nook neighbourhood. Senior Building Co. (1946), Ltd., Cheadle (46); Marsden & Chapman, Ltd., Timperley (86); A. D. Locke (1940), Ltd., Lostock-rd., Urmston (77); Marsden & Chapman, Ltd., Timperley (37); T. Costello, Ltd., Heaton Moor (78).

Morecambe.—36 houses at Blackberry Hall estate: *Wm. Gardner & Co., Ltd., Foxholes-rd., Morecambe.

Newcastle-on-Tyne.—Additions and alterations to factory of Landauer & Co., Cheviot View, Newcastle-on-Tyne: *Dickinson Bros., 30, Cloth-market, Newcastle.

Newcastle-under-Lyme.—20 houses off Lower Milehouse-la., Cross Heath, for B.C.: *Mr. A. Jones, Chesterton, £25,747.

Northallerton.—Adaptations, extensions and new 10 bed block at Friarage Hospital: *R. Blackett & Sons, Darlington.

Northampton.—Eight dwellings at King's Heath, for B.C.: *Clements Bros. (Northampton), Ltd., 64, St. Andrews-st., Northampton, £11,481.

Oldham.—Three-storey lavatory block at School of Art: *Haldean Building Co., Ltd., Booth-street, Middleton; additional classrooms at Alexandra Park County School: *A. Hoggins, Ltd., 2a, St. John's-st., Werneth, Oldham.

Orrell.—38 houses at Moor-rd. estate: *E. Rylance & Sons, Ltd.

Reading.—Erection of 128 "Wates" houses at the Whitley Wood-rd. estate, Reading, for C.B.: *Wates, Ltd., London-rd., Norbury, S.W.16, £158,544.

Reigate.—Erection of 46 "Wates" houses and 14 traditional houses for B.C. at Dovers Green estate: *Wates, Ltd., London-rd., Norbury, S.W.16, £81,009. Roads and sewers on the above estate: *Wates, Ltd., £18,989.

St. Pancras.—Erection of 132 flats for first stage of the Clarence Way Housing Scheme, for B.C.:—

Trollope & Colls, Ltd.	£300,827
Richard Costain, Ltd.	300,095
A. T. Rowley (London), Ltd.	299,514
Foster & Dicksee, Ltd.	297,625
Globe Contractors, Ltd.	297,482
Dove Brothers, Ltd.	297,288
F. & H. F. Higgs, Ltd.	296,645
Geo. Parker & Sons, Ltd.	296,122
Harry Neal, Ltd.	295,373
William Moss & Sons, Ltd.	289,780
*Tersons, Ltd.	284,999

Scottish Special Housing Association, Ltd.—Contracts placed between March 21 and April 20:—

House Erection.

Netherthird, Cumnock (32 Weir), Thomas Wyllie & Son, 13, Waterloo-st., Kilmarnock. Water supply pipes; Deanfield-drive, Bo'ness (22 Trad.), A. M. Tweedie & Co., Ltd., 44-52, Bilbao-st., Glasgow, Chain link fencing; Inchterf, Milton of Campsie (4 Trad.), S.W. Scotland Electricity Board, 137, Almada-st., Hamilton, Electric service cable; Delph Wood, Tullibody (228 Trad.), Scottish Gas Board, Alloa, Gas services.

Gorebridge, Midlothian (36 Trad.), N. Thomson, Croft-st., Dalkeith, Excavator brick; P

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Mains of Fintry, Dundee (7 Atholl.), Alexander & Son, Belford-rd., Edinburgh, Handrails.

Bellsmyre, Dumbarton (50 Trad.), Cowiesons, Ltd., 3, Charles-st., St. Rollox, Glasgow, Excavator, concrete and brickwork, joiner and plumber; W. Gregory, 102, Motherwell-st., Airdrie, Electrical; R. T. Ritchie & Co., Ltd., Westmuir-st., Glasgow, Tiler and roughcast; Robert Lindsay, 34, College-st., Dumbarton, Plaster; McDonald & Hughes, 164-168, Maryhill-st., Glasgow, Glazier.

Laighstonehall, Hamilton (130 Orlit), Barnet & Morton, Ltd., High-st., Kirkcaldy, Fencing. Kirkconnel, Dumfries (20 Trad.), Geo. Shankland & Sons, Kirkconnel, Fencing. Various sites (42 Trad.), Barnet & Morton, Ltd., 192, High-st., Kirkcaldy, Fencing. Bellsmyre, Dumbarton (50 Trad.), A. Cooke, 67, High-st., Renfrew, Painter.

Brora, Sutherlandshire (12 Trad.), James Sutherland, Golspie, Mason, etc.; Thos. Matheson & Son, Brora, Plaster; John Reid & Son, Inverness, Roof tiler and roughcast; James Thow, Ltd., Ayr, Glazier; Peter McKerracher & Sons, Ltd., Glasgow, Painter; Alexander Sutherland, Golspie, Electrical; Thomson & Kay, Inverness, Carpenter.

Laighstonehall, Hamilton (52 Trad.), Scottish Gas Board, Hamilton, Gas services.

Site Servicing.

Cairnhill-rd., Airdrie (10 Trad.), S.S.H.A., Surfacing roads

House Erection.

Forehill-rd., Ayr (42 Trad.), S.S.H.A., All trade except plumber and electrical. Shortlees, Kilmarnock (32 Trad.), S.S.H.A., All trades except plumber and electrical. Beith-rd., Johnstone (40 Trad.), S.S.H.A., All trades except plumber and electrical.

Maintenance.

Polbeth, Midlothian (56 Timber), Alex. Lawson, 37, King-st., Bathgate, External painter. Watling-st., Motherwell (22 Swedish; 40 Canadian; 94 Concrete), Barrie & Co., 100, Windmillhill-st., Motherwell, External painter. Carfin Hall, Lanarkshire (2 Canadian), Barrie & Co., 100, Windmillhill-st., Motherwell, External painter.

Maxwood-rd., Galston (12 Swedish), R. Torrance & Son, 20-22, Polworth-st., Galston, External painter. Race-rd., Bathgate (76 Swedish), N. G. Baxter, Ltd., Kilsyth, External painter. Newtown, Bo'ness (56 Swedish), N. G. Baxter, Ltd., Kilsyth, External painter.

Southport.—18 houses at Grantham-rd. site, for B.C.: *T. Southworth & Sons, Ltd., 142a, Virginia-st., Southport, £20,666.

Stourport-on-Severn.—48 houses at Walshes Farm estate, for U.D.C. Godwin, Clist & Greenway (FF.), Bank-bldgs., Kidderminster. Quantities by A. E. Wilson, Broadgate-chbrs., Ludlow: *Mr. Percy Cox, Quarry Bank, Brierley Hill, Staffs, £65,175.

Surbiton.—Block of married quarters for the Receiver to the Metropolitan Police at No. 8, The Avenue, Surbiton, Surrey. Chartered architect and surveyor, New Scotland Yard, S.W.1. Quantities by F. J. Meekins & Partners, 112, Park-st., W.1: *Wates, Ltd., London-rd., Norbury, S.W.16, £11,738.

Tottenham.—135 dwellings at Cheshunt, for B.C.: *Mathew James & Co., 24, Violet-rd., E.3, £185,113 (subject to M.H. approval).

Wainford (Suffolk).—Erection of 10 bungalows at three sites, for R.D.C. J. Owen Bond & Son, architects, St. Faiths House, Mountergate, Norwich. Rumburgh & Redisham sites (8 bungalows): *Wm. C. Reade, of Aldeburgh, Ltd., High-st., Aldeburgh, Suffolk, £6,688. Mettingham site (2 bungalows): *Thirtle & Harris, Hales, Norwich, £1,850.

Wigan.—114 houses at Norley Hall, for B.C.: *Direct Labour, £145,300.

Worcester.—Erection of 90 "Wates" houses on the Newtown No. 3 estate, Worcester, for T.C.: *Wates, Ltd., London-rd., Norbury, S.W.16, £107,178.

Wycombe.—30 houses and bungalows at Bourne End site, for R.D.C. J. M. Smith (F.), Architect & S., 100, Easton-st., High Wycombe, Bucks: *H. G. Wheeler & Son, Ltd., Penn, nr. High Wycombe

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